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	L #	Hits	Search Text	DBs	Time Stamp
1	L3	14987	biolumines\$ or fluorescen\$ near4 protein\$1 or luciferase\$1 or photoprotein\$1	USPAT; US-PGPUB	2003/02/24 15:09
2	L4	13461 5	bubble\$	USPAT; US-PGPUB	2003/02/24 15:10
3	L5	878	3 and 4	USPAT; US-PGPUB	2003/02/24 15:10
4	L6	15	3 same 4	USPAT; US-PGPUB	2003/02/24 17:01
5	L7	68310	toy or novelty	USPAT; US-PGPUB	2003/02/24 15:40
6	L8	30	5 and 7	USPAT; US-PGPUB	2003/02/24 15:40
7	L9	17	3 same 7	USPAT; US-PGPUB	2003/02/24 17:01
8	L10	20	3 and toy	USPAT; US-PGPUB	2003/02/24 17:09
9	L11	13	10 not 8	USPAT; US-PGPUB	2003/02/24 17:25
10	L12	22	3 and novelty adj item\$1	USPAT; US-PGPUB	2003/02/24 17:24
11	L13	12	12 not 8	USPAT; US-PGPUB	2003/02/24 17:25
12	L14	228	((chemilumines\$ or lumines\$8 or glow\$8) same 4) not 3	USPAT; US-PGPUB	2003/02/24 18:04
13	L15	20	((chemilumines\$ or lumines\$8 or glow\$8) near4 4) not 3	USPAT; US-PGPUB	2003/02/24 17:47
14	L16	6	14 and 7	USPAT; US-PGPUB	2003/02/24 18:04
15	L17	0	14 and 4 adj bath	USPAT; US-PGPUB	2003/02/24 18:21

	L #	Hits	Search Text	DBs	Time Stamp
1	L3	14987	biolumines\$ or fluorescen\$ near4 protein\$1 or luciferase\$1 or photoprotein\$1	USPAT; US-PGPUB	2003/02/24 15:09
2	L4	13461 5	bubble\$	USPAT; US-PGPUB	2003/02/24 15:10
3	L5	878	3 and 4	USPAT; US-PGPUB	2003/02/24 15:10
4	L6	15	3 same 4	USPAT; US-PGPUB	2003/02/24 15:11

PGPUB-DOCUMENT-NUMBER: 20030028070

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030028070 A1

TITLE: Method and apparatus for electromagnetically restructuring ingestible substances for organismic consumption

PUBLICATION-DATE: February 6, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Jacobson, Jerry I.	Jupiter	FL	US	

APPL-NO: 10/ 013325

DATE FILED: December 10, 2001

RELATED-US-APPL-DATA:

child 10013325 A1 20011210 parent continuation-in-part-of 09386696 19990831 US  
PENDING child 09386696 19990831 US parent continuation-in-part-of 08986832  
19971208 US ABANDONED

US-CL-CURRENT: 600/9

ABSTRACT:

A method for beneficially restructuring ingestible substances such as sports drinks, water, nutraceuticals, pharmaceuticals, and the like and its contents for consumption by organisms. The method is also applied to topical substances such as lotions and creams. The method involves subjecting such substances for a period of time to an electromagnetic field of a specified flux density varying from 10.sup.-5 to 10.sup.-21 gauss and a specific frequency varying from 0 hertz to 300 hertz, depending on the intended subsequent use of the substance. The specific flux density and the specific frequency is empirically determined to restructure the substances such that the substances beneficially affect the organism which has the substances incorporated into the organism's metabolism.

RELATED APPLICATIONS

[0001] This application is a continuation-in-part of co-pending application Ser. No. 09/386,696 filed Aug. 31, 1999, which is a continuation-in-part of application Ser. No. 08/986,832, filed Dec. 8, 1997. This application claims priority to the filing date of both the prior filed applications. This application is also related to U.S. Pat. Nos. 5,269,746, 6,004,257 and 6,099,459 of the same inventor as the inventor herein.

----- KWIC -----

Detail Description Paragraph - DETX:

[0038] In vacuo, the dominant force is the static force, and in condensed systems the dominant force is the radiated force. Moving from the gaseous state to the liquid state the density of water is 1600 times greater, thus increasing the force between molecules accordingly. In renormalizing frequency electromagnetic field is trapped in the ground state while (mv) remains the same. When momentum (mv) is renormalized the trapped light will come out e.g., bioluminescence. Light will be emitted by biosystems (e.g. sono-luminescence) when sound waves are produced in the system. From the antinode of the stationary wave light is emitted. The frequency of the emitted light depends upon the liquid. Each liquid has its own frequency. Biosystems have many frequencies contained by the solvent. Collapsing bubbles affect temperature (a diabatic compression) in applying van der Waals equation, p molecules are excited and light is emitted.

PGPUB-DOCUMENT-NUMBER: 20020166769

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020166769 A1

TITLE: Apparatus and method for combined capillary separation and blotting of biological macromolecules

PUBLICATION-DATE: November 14, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Serikov, Vladimir B.	Davis	CA	US	

APPL-NO: 09/ 734452

DATE FILED: March 5, 2001

US-CL-CURRENT: 204/464,204/455 ,204/462 ,204/605 ,204/613 ,204/614

ABSTRACT:

An apparatus and method are described for capillary separation of macromolecules and precise post-separation blotting. Apparatus include disposable separating element (capillary), which contains a sieving or interaction matrix inside, an external layer of blotting material, positioned close to the boundary of said sieving or interaction matrix, and the membrane with changeable permeability for separated material; said membrane separates blotting layer from the sieving or interaction matrix. After separation of macromolecules in capillary with initially non-permeable walls, chemical or physical modification of the membrane is performed, which is followed by changing the vector of driving forces for transfer, so that separated molecules are moved through the walls of the capillary and blotted to the outer layer of separating element, which contains blotting material. Means of modification of the membrane include chemical or physical modification, leading to changes in permeability. Change in driving forces may include electrical charge application, bulk flow of fluid or hydrostatic pressure.

----- KWIC -----

Summary of Invention Paragraph - BSTX:

[0005] After separation is complete, deposition membrane with blotting material is placed in contact with gel. A common transfer process is called "electro-blot" transfer. In the "electro-blot" transfer process, the macromolecules in the gel slab move under an electric field to a blotting membrane. In designing an electro-blot transfer system it is essential that

the blotting membrane be in close contact with the gel slab. Presence of gas **bubbles** between the gel slab and blotting membrane will prevent the band images from being transferred properly. It is also important to maintain a uniform electric field across the electro-blot sandwich. Transfer of the gel slab onto the nitrocellulose membrane must be carefully performed so that the macromolecules on the gel membrane are not removed or contaminated. After transfer, a labeling procedure must be employed, and a detection technique must be utilized so that the samples can be analyzed. A commonly used detection method involves staining and de-staining of the gel slab. This technique imposes staining of the entire gel with a dye that only adheres to the macromolecules. Then a de-staining process is performed, wherein dye not adhered to the macromolecules is washed away; bands of macromolecules thus become detectable. Another common detection method is the use of antibodies. Bands of proteins or samples are blotted or transferred to a binding membrane, which binds macromolecules. Then, a known antibody is introduced. The antibody combines with a specific protein if it is present in a sample. In order to detect the antibody-protein combination, **the antibodies are labeled with fluorescent** or radioactive tags or have enzyme activity, which is further detected by separate methods (F. Ausubel et al (Ed.), Current Protocols in Molecular Biology, Ed. Current Protocols, Wiley, N.Y., 1994, Chapter 10).

PGPUB-DOCUMENT-NUMBER: 20020049184

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020049184 A1

TITLE: Solution of galactomannans as a sieving matrix in capillary electrophoresis

PUBLICATION-DATE: April 25, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Dolnik, Vladislav	Mountain View	CA	US	
Gurske, William A.	Fremont	CA	US	
Padua, Allan	San Mateo	CA	US	

APPL-NO: 09/ 946396

DATE FILED: September 5, 2001

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60230507 20000906 US

non-provisional-of-provisional 60230508 20000906 US

US-CL-CURRENT: 514/54,536/114

ABSTRACT:

Galactomannans with a reduced protein content in an anhydrous, powder form, a process of producing same and a capillary column containing a composition of the galactomannans for use as a sieving matrix in capillary electrophoresis are disclosed.

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Ser. Nos. 60/230,507 and 60/230,508, filed on Sep. 6, 2000, the entire disclosure of which is incorporated herein.

----- KWIC -----

Detail Description Paragraph - DETX:

[0055] SDS capillary electrophoresis was performed on the instrument for capillary array electrophoresis MegaBACE 1000.TM. (Molecular Dynamics, Sunnyvale, Calif.). The instrument is equipped with 96 capillaries organized



in 6 arrays The fused silica capillaries are 62 cm long with the effective length of 40 cm, internal diameter of 75  $\mu\text{m}$ , and outer diameter of 360  $\mu\text{m}$ . The instrument was thermostated at 27 $^{\circ}\text{C}$ . Before a separation run the capillaries were twice flushed with deionized water at pressure of 620 kPa (90 psi). Guaran sieving matrix made after Example 11 was delivered into 2 mL tubes and centrifuged at 10,000 RPM to remove bubbles. The tubes with the guaran matrix were placed in the anode stage and pumped under pressure 6.9 MPa (1000 psi) for approx. 30 s. 96 micro well plate was filled with 100  $\mu\text{L}$  50 mM Tris, 50 mM HEPES, 4 mM SDS. Before sample injection the capillary tips were extensively washed with deionized water to remove guaran matrix from the outer surface of the capillaries. FITC labeled proteins were injected for 3 s at 10 kV. After the injection the capillary tips were washed again to remove excessive sample. The electrophoretic run was made applying voltage of +12 kV on the anode side of the system for 20 min. The FITC labeled proteins were detected by measuring fluorescence induced with 488 nm argon laser. After the electrophoretic run, the sieving matrix was pumped out under pressure of 6.9 MPa (1000 psi) and flushed repeatedly with distilled water under pressure of 620 kPa (90 psi). Results shown in FIG. 11.

PGPUB-DOCUMENT-NUMBER: 20020004942

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020004942 A1

TITLE: Bioluminescent novelty items

PUBLICATION-DATE: January 10, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Bryan, Bruce	Beverly Hills	CA	US	

APPL-NO: 09/ 803211

DATE FILED: March 8, 2001

RELATED-US-APPL-DATA:

child 09803211 A1 20010308 parent continuation-of 09444762 19991122 US PENDING  
child 09444762 19991122 US parent continuation-of 09135988 19980817 US GRANTED  
parent-patent 6152358 US child 09444762 19991122 US parent continuation-of  
08757046 19961125 US GRANTED parent-patent 5876995 US child 09444762 19991122  
US parent continuation-of 08597274 19960206 US GRANTED parent-patent 6247995 US  
non-provisional-of-provisional 60079624 19980327 US  
non-provisional-of-provisional 60089367 19980615 US

US-CL-CURRENT: 800/288

ABSTRACT:

Novelty items that are combinations of articles of manufacture with fluorescent proteins are provided. These novelty items, include combinations of transgenic plants that express a luciferase or a luciferin with plant food that contains a luciferase and a luciferin.

RELATED APPLICATIONS

[0001] This application is a continuation of U.S. application Ser. No. 09/444,762 to Bruce Bryan, filed Nov. 22, 1999, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also continuation of U.S. application Ser. No. 09/135,988 to Bruce Bryan, filed Aug. 17, 1998, now U.S. Pat. No. 6,152,358, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also continuation-in-part of U.S. application Ser. No. 08/757,046 to Bruce Bryan, filed Nov. 25, 1996, now U.S. Pat. No. 5,876,995, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also a continuation-in-part of U.S. application Ser. No. 08/597,274, now allowed, to Bruce Bryan, filed Feb. 6, 1996, entitled "BIOLUMINESCENT NOVELTY ITEMS".  
[0002] U.S. application Ser. No. 09/444,762 is a continuation of U.S.

application Ser. No. 09/135,988, which is a continuation-in-part of U.S. application Ser. No. 08/757,046, which is a continuation-in-part of U.S. application Ser. No. 08/597,274. The subject matter of each of U.S. application Ser. Nos. 09/135,988, 08/597,274 and 08/757,046 is herein incorporated in its entirety by reference thereto. This application is also related to provisional application Ser. Nos. 60/079,624 and 60/089,367. The disclosures of each of the above noted patents, applications and provisional applications is incorporated herein by reference thereto.

----- KWIC -----

#### Summary of Invention Paragraph - BSTX:

[0012] Systems and apparatus for generating bioluminescence, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; bubbles in bubble making toys and other toys that produce bubbles; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, make-up, toothpastes and other dentifrices, soaps, body paints, and bubble bath; items such as inks, paper; foods, such as gelatins, popcorn, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a luciferase; plant food containing a luciferin or luciferase, preferably a luciferin for use with transgenic plants that express luciferase; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

#### Summary of Invention Paragraph - BSTX:

[0013] Thus, the novelty items provided herein include but are not limited to: textiles that glow, ink that glows, paints, particularly fingerpaints, that glow, paper products that glow, toys, particularly reloadable squirt guns that eject a bioluminescent fluid, dolls and dummies with internal organs or parts that glow, figurines and novelty items that glow; toy "cigarettes" that produce glowing "smoke" upon exhalation, toy eggs with glowing yolks and/or whites, toy footbags that glow and toy board and card games with glowing parts, such as glowing cards, dice, game boards, etc.; foods and beverages that glow, soapy compositions for blowing bubbles that produce bubbles that glow, bubble bath compositions that produce bubbles that glow, fountains that expel glowing fluid, bioluminescent "fireworks", sparklers, magic-wand toys, and numerous other such items. Food containing a luciferin for use with plants and animals that express luciferase, such as transgenic fish, then when fed a food containing an appropriate substrate glow, is also contemplated herein.

Detail Description Paragraph - DETX:

[0150] Novelty items are understood by those of skill in manufacture of such items as well as by the purchasing public and are intended herein to include items, such as, toys, including toy guns, dolls, dummies, figurines, balloons, **bubbles**, "fairy dust", such as micronized lyophilized particles, puzzles, and inks and paints, particularly fingerpaints; theatrical vapors when mixed, for example with dry ice or a fog; souvenirs; textiles, particularly clothing, including T-shirts, hats, swimsuits, bathing suit, wet suits, scuba diving suits, surfing suits, and other water sport or sports attire; foods and beverages, including gelatins, ice cubes and ice in other shapes, beer, wine, champagne, soft drinks, ice creams, sorbets, ices, frostings, and candy; jewelry, medallions, decorative articles, artificial flowers, articles for displaying names, business trade names, slogans, trademarks on promotional or other such items, such as T-shirts, hats, paints, wrapping paper, gifts intended to promote business goodwill; personal items, such as body paints, body sprays, **bubble** baths, make-up, body lotions, dentifrices; fountains; jets or sprays of particles or fluids, including "fireworks", sparklers, and magic-wand toys, and many other such novelty items [see, e.g., U.S. Pat. Nos. 5,435,010, 5,460,022, 5,458,931, 5,435,787, 5,435,010, 5,432,623, 5,421,583, 5,419,558, 5,416,927, 5,413,454, 5,413,332, 5,411,427, 5,410,962, 5,407,691, 5,407,391, 5,405,958, 5,405,206, 5,400,698, 5,399,122, 5,398,972, 5,397,609, 5,396,408, 5,393,580, 5,390,086, 5,389,033, 5,383,684, 5,374,805, 5,368,518, 5,363,984, 5,360,010, 5,353,378, 5,351,931, 5,346,455, 5,341,538, 5,323,492, 5,283,911, 5,222,797, 5,177,812, 5,158,349, 4,924,358, 3,597,877 and many others, which describe types of items are considered novelty items]. Any such inanimate item that is combined with **bioluminescence** is intended to be encompassed herein.

Detail Description Paragraph - DETX:

[0219] This system is among the preferred systems for use herein. As will be evident, since the aequorin **photoprotein** includes noncovalently bound luciferin and molecular oxygen, it is suitable for storage in this form as a lyophilized powder or encapsulated into a selected delivery vehicle. The system can be encapsulated into pellets, such as liposomes or other delivery vehicles, or stored in single chamber dual or other multiple chamber apparatus. When used, the vehicles are contacted with a composition, even tap water, that contains  $\text{Ca}^{2+}$  [or other suitable metal ion], to produce a mixture that glows. This system is preferred for use in numerous embodiments herein, such as in any embodiment that uses pellets. These embodiments include, squirt guns, fairy dust, **bubble** toys, **bubble** baths, soaps, linked to textiles, for addition to beverages and foods.

Detail Description Paragraph - DETX:

[0245] Lyophilized mixtures, and compositions containing the Renilla **luciferase** are also provided. The **luciferase** or mixtures of the **luciferase** and luciferin may also be encapsulated into a suitable delivery vehicle, such as a liposome,

glass particle, capillary tube, drug delivery vehicle, gelatin, time release coating or other such vehicle. Kits containing these mixtures, compositions, or vehicles and also a selected article of manufacture, such as a toy gun, **bubble** composition, balloon, item of clothing, personal item, are also provided. The **luciferase** may also be linked to a substrate, such as cotton, polyester, polyester-cotton blends, polypropylene, polyvinyltoluene, polyvinyl propylene, glass, ceramic, or plastics are provided in combination with or as part of an article of manufacture.

Detail Description Paragraph - DETX:

[0268] These mutant **luciferases** as well as the wild type **luciferases** are among those preferred herein, particularly in instances when a variety of colors are desired or when stability at higher temperatures is desired. It is also noteworthy that firefly **luciferases** have alkaline pH optima [7.5-9.5], and, thus, are suitable for use in combination with articles of manufacture, such as the **bubble** compositions that have alkaline pH.

Detail Description Paragraph - DETX:

[0279] Addition of ATP and luciferin to a reaction that is exhausted produces additional light emission. Thus, the system, once established, is relatively easily maintained. Therefore, it is highly suitable for use herein in embodiments in which a sustained glow is desired or reuse of the item is contemplated. Thus, the components of a firefly system can be packaged with the item of manufacture, such as a toy gun, and then combined with the article before use. For example, the luciferin and ATP can be added to a mild **bubble** or a protein composition that contains **luciferase** each time the **bubbles** are used.

Detail Description Paragraph - DETX:

[0324] GFPs and/or BFPs or other such **fluorescent proteins** may be used in any of the novelty items and combinations provided herein, such as the beverages and toys, including **bubble** making toys, particularly **bubble-making** compositions or mixtures and cosmetics. Such systems are particularly of interest because no **luciferase** is needed to activate the **photoprotein** and because the proteins are readily digested. These **fluorescent proteins** may also be used in addition to **bioluminescence** generating systems to enhance or create an array of different colors.

Detail Description Paragraph - DETX:

[0333] Attachment of phycobiliproteins to solid support matrices is known (e.g., see U.S. Pat. Nos. 4,714,682; 4,767,206; 4,774,189 and 4,867,908). Therefore, phycobiliproteins may be coupled to microcarriers coupled to one or more components of the **bioluminescent** reaction, preferably a **luciferase**, to convert the wavelength of the light generated from the **bioluminescent** reaction.

Microcarriers coupled to one or more phycobiliproteins may be used in any of the novelty items and combinations provided herein, such as the multicolor beverages and toys, including **bubble** making toys, particularly **bubble-making** compositions or mixtures.

Detail Description Paragraph - DETX:

[0425] Because the **bioluminescence** generating system components are mixed within the entire bottle, those contents must be used shortly after mixing. Thus, this type of packaging is particularly suitable for use with **bioluminescence** systems that are consumed in a single use or activity such as **bubble-blowing**.

Detail Description Paragraph - DETX:

[0447] The **bioluminescence** generating systems provided herein are contemplated for use with various substances to glow the substance. For example, as discussed below, the **bioluminescence** generating system components may be used to produce glowing aqueous mixtures housed in transparent portions of articles of manufacture, thereby illuminating that portion of the article of manufacture. Additionally, the **bioluminescence** generating system components may be used to produce glowing food or beverage products, textiles, creams, lotions, gels, soaps, **bubbles**, papers, powders or water. Following are brief examples of combinations of **bioluminescence** systems with articles of manufacture and the resulting novelty items contemplated herein.

Detail Description Paragraph - DETX:

[0453] Suitable bath powders and **bubble** baths and other **bubble** compositions for use in these combinations are well known to those of skill in the art [see, e.g., U.S. Pat. Nos.: 5,478,501 4,565,647; 5,478,490; 5,412,118; 5,401,773; and many other examples]. These may be modified by adding the **bioluminescence** generating system components.

Detail Description Paragraph - DETX:

[0496] Examples of uses of the **bioluminescence** generating systems in toys include illumination of dolls, toy vehicles, hoola hoops, yo-yos, balloons, immersible **bubble** generating toys, such as a toy submarine that blows glowing **bubbles**, and any other toy amenable to having a generally translucent covering defining a space for containment of the **bioluminescence** generating system and addition of the final ingredients necessary for the illumination reaction. Also contemplated herein are toys that eject or spew a fluid. For example, toy or game projectiles are contemplated that contain a **luciferase and bioluminescence** substrate in an oxygen-free environment. The projectiles rupture upon impact with a hard surface thereby exposing the contents to moisture in the air that contains dissolved oxygen, the **bioluminescence** activator, and causing reaction.

Detail Description Paragraph - DETX:

[0523] Numerous toy guns and other toy weapons that shoot pellets or liquid, in addition to those exemplified herein, are suitable for use in combination with the bioluminescence generating systems herein. The toy weapons may be loaded with a composition containing microspheres of luciferin and/or luciferase, or with lyophilized luciferin/luciferin, or other mixtures as described herein. Suitable toy weapons and devices that shoot jets or sprays of water are described in the following sampling of U.S. Pat. No. 5,462,469 [toy gun that shoots bubbles]; U.S. Pat. No. 5,448,984 [toy gun that shoots balls and water and can be modified to shoot light or temperature sensitive pellets, which should be stored under appropriate conditions or appropriately packaged, that release luciferin/luciferase when exposed to light]; U.S. Pat. Nos. 5,439,139; 5,427,320; 5,419,458; 5,381,928; 5,377,656; 5,373,975; 5,373,833 and 5,373,832 [which describe toy guns that rely upon a pressurizable bladder for release of air-pressure to shoot a projectile, which can be modified to shoot projectiles of encapsulated luciferin/luciferase]; U.S. Pat. Nos. 5,370,278 [which describes liquid from a port mounted to a headband]; U.S. Pat. Nos. 5,366,108; 5,360,142 [which describes a supply and delivery assembly for use in combination with a pump type water gun or other water propelling device]; U.S. Pat. Nos. 5,346,418; 5,343,850 [which describes a projectile launcher for use in combination with the pellets provided herein]; U.S. Pat. Nos. 5,343,849; 5,339,987 [which describes water guns that have at least one pressurizable air/water storage tank, a pressurizing mechanism, a channel of release for shooting water and a release mechanism]; U.S. Pat. Nos. 5,326,303; 5,322,191; 5,305,919; 5,303,847 [which describes a device worn on a user's hand with sheaths for the tips of the fingers that includes a housing for a water reservoir, a water pump and electrical motor and a battery pack to be secured to the user's body]; U.S. Pat. Nos. 5,292,032; 5,284,274 [which describes an action to system including a capsule for containing water, which will herein contain components of a bioluminescence generating system, having an orifice and a plunger and a spring loaded mechanism for driving the water from the orifice. The action toy may be configured as a shotgun accepting a plurality of prefilled shell capsules into its breechblock for firing through its barrel, as a missile launcher in which the capsules are mounted to the front of the launcher and the water is ejected directly from the capsule against the target, or as a crossbow with the bow loading the spring-loaded mechanism and a water stream obtained on release of the bow]; U.S. Pat. No. 5,284,272 [which describes a bottle and cap combination for spewing liquid]; U.S. Pat. Nos. 5,256,099; 5,244,153; 5,241,944; 5,238,149; 5,234,129; 5,224,625; 5,213,335; 4,854,480; 5,213,089; 5,184,755; 5,174,477; 5,150,819; 5,141,467; 5,141,462; 5,088,950; 5,071,387 [which describes a figurine-shaped water squirting toy]; U.S. Pat. No. 5,064,095 [which describes a water cannon apparatus]; U.S. Pat. Nos. 5,029,732; 5,004,444; 4,892,228; 4,867,208 [which describes an apparatus for storing and dispensing fluid under pressure]; U.S. Pat. Nos. 4,808,143; 4,784,293; 4,768,681; 4,733,799; 4,615,488 and many others. U.S. Pat. No. 5,415,151 describes a toy gun that launches projectiles that can be adapted for shooting the pellets, such as light sensitive pellets that are degraded upon exposure to light, provided herein.

Detail Description Paragraph - DETX:

[0526] Such compositions, preferably those that have near neutral pH, can be combined with the components of the **bioluminescence** generating systems provided herein. In particular, a mixture of **luciferase** and luciferin, such as the Renilla system or firefly system or Cypridina system, preferably in the form of pellets or microspheres, such as liposomes or other time release capsule, can be added to the **bubble** mixture. When used, the air added to the mixture will cause a glow, or a glow will be produced as the contents of the pellets are released into the composition. Alternatively, one or more component of the **bioluminescence** generating system may be added to the **bubble** making composition, such as, for example, a **luciferase** and any necessary activators, and the remaining component(s), e.g., a luciferin, may be directly applied to **bubbles** using a fine spray from an atomizer or other suitable spray or misting means.

Detail Description Paragraph - DETX:

[0527] In addition, a **fluorescent protein**, such as GFP, BFP or a phycobiliprotein, may be added to the **bubble-making** composition and then illuminated using an external light source. For example, **bubbles** containing a **fluorescent protein** may be produced in a room illuminated with light of an appropriate wavelength to cause the **fluorescent protein** to fluoresce.

Detail Description Paragraph - DETX:

[0528] Alternatively, the **fluorescent protein** may be added to the **bubble-making** composition containing all the components of the **bioluminescence** generating system to effect a change of the color of the **bubbles**. For example, the **fluorescent proteins** may be added to the **bubble-making** composition directly or may be added in time-released or slowly-dissolving microspheres or liposomes, such that release of a **fluorescent protein in the bubble** composition, such as, for example, GFP or a phycobiliprotein, introduces a change in the color of the **bubbles**. It is particularly advantageous to have the **fluorescent protein** released into the composition after the container has been opened and used. A single bottle of **bubble-making** solution will be amenable to the production of more than one color of **bubbles**. For example, microparticles or liposomes susceptible to breakdown by exposure to air or by agitation by the wand or stick used for blowing **bubbles** are of particular interest.

Detail Description Paragraph - DETX:

[0529] Kits containing such soap compositions, with preferably a moderate pH [between 5 and 8] and **bioluminescence** generating reagents, including **luciferase** and luciferin and the **fluorescent protein** are provided herein. These kits, for example, can be used with a **bubble-blowing** or producing toy. These kits can also include a reloading or charging cartridge, such as the cartridges provided herein.



Detail Description Paragraph - DETX:

[0642] FIGS. 12 and 13 illustrate a preferred embodiment of the bottle/bladder apparatus adapted for use with **bioluminescent bubble** compositions. This **bubble** composition bottle has a bladder 300 positioned within it and held in place, in the neck 302 of the bottle, by friction. A collar 304 is positioned on the neck of the bottle 302, preventing the cap 306 from being screwed completely onto the top of the bottle. The cap 306 contains a plunger 308 which operates to push the bladder 300 into the body of the bottle when the collar 304 is removed and the cap 306 is screwed down tightly. Upon entering the body of the bottle, the bladder is pierced by a piercing pin 310 located on the bottom of the bottle; thereby releasing the contents of the bladder into the bottle. FIG. 13 shows the bottle with the collar 304 removed, the cap 306 screwed on tightly, and the bladder 300 collapsed within it.

Detail Description Paragraph - DETX:

[0643] Component(s) [less than all] of the **bioluminescence** generating reaction are contained in the bladder. The components may be in the form of a solution, suspension, suspended particles, or particles. Prior to use the bottle may be gently agitated. The particles may be time release capsules that release their contents upon exposure to the **bubble** composition or from which the contents diffuse upon mixing of the contents of the bladder with the **bubble** composition. The remaining component(s), such as Ca.sup.2+ or ATP, are contained in the **bubble** composition 314, which is preferably a mild **bubble** forming composition. Selection of the **bioluminescence** generating composition depends upon the selected **bubble** composition and also the desired action. In other embodiments, remaining components, such as ATP, FMN, a flavin reductase or other component that may be somewhat sensitive to the **bubble** composition, of the **bioluminescence** generating system may be added to the **bubble** composition just prior to use.

Detail Description Paragraph - DETX:

[0644] The collar 304 of the bottle is adapted with a **bubble** blowing ring 312, with arm, integral thereto. Thus, the collar 304 is removed, the bladder 300 pierced within the bottle as described and the **bubble** blowing ring 312 dipped into the mixed composition, withdrawn and **bioluminescent bubbles** blown. A standard **bubble** blowing wand [arm with ring] may be used and/or provided in place of that depicted in FIG. 12.

Detail Description Paragraph - DETX:

[0646] The bottle 316 may be fabricated of any material ordinarily used for dispensing **bubbles**. It may be transparent or translucent to the **bioluminescent** light so that any glow in the bottle can be seen.

US-PAT-NO: 6498233

DOCUMENT-IDENTIFIER: US 6498233 B1

TITLE: Nucleic acid transfer system

DATE-ISSUED: December 24, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wels; Winfried	D-79312	N/A	N/A	DE
Fominaya; Jesus	Emmendingen	N/A	N/A	ES
	Madrid			

APPL-NO: 08/ 840713

DATE FILED: April 25, 1997

PARENT-CASE:

CROSS REFERENCE TO RELATED APPLICATION This application is a continuation-in-part of International Application PCT/EP95/04270, filed Oct. 31, 1995, and designating the U.S.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
GB	94810627	November 1, 1994

US-CL-CURRENT: 530/350

ABSTRACT:

The invention pertains to a nucleic acid transfer system including a translocation domain of toxins, especially of diphtheria toxin suitable for targeting a nucleic acid, e.g. a gene, to a specific cell, and obtaining expression of said nucleic acid. The nucleic acid transfer system of the invention comprises a multidomain protein component and a nucleic acid component. Furthermore, the present invention relates to the multidomain protein, a nucleic acid encoding said protein, suitable amplification and expression systems for said nucleic acid, and processes for the preparation and uses of the above subject matters.

3 Claims, 0 Drawing figures

Exemplary Claim Number: 1

----- KWIC -----

#### Detailed Description Text - DETX:

Calcium phosphate transfections of COS-1 and SK-BR-3 cells are carried out with the pSV2LUC-G4 reporter plasmid described in Example 10. To DNA solutions in water 2.5 M calcium chloride is added to a final concentration of 166 mM calcium chloride. 1 volume of 2.times.HBS buffer, pH 7.12, containing 50 mM HEPES, 15 mM Na.sub.2 HPO.sub.4, and 280 mM sodium chloride, is added dropwise with constant flow of air bubbles through the mixture. The final DNA concentration in the mixture is 10 nM in the experiment with COS-1 cells and 1.9 nM in the experiment with SK-BR-3 cells. Crystals are allowed to form in the solution for 30 min at room temperature. 100 ml of the solution is added to one well of tissue culture cells in 12 well tissue culture plates as described in 13.2, cells are harvested and luciferase units are determined as described in 13.3.

US-PAT-NO: 6458071

DOCUMENT-IDENTIFIER: US 6458071 B1

TITLE: Method for electromagnetically restructuring water for organismic consumption

DATE-ISSUED: October 1, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jacobson; Jerry I.	Jupiter	FL	33477-141	N/A

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APPL-NO: 09/ 386696

DATE FILED: August 31, 1999

PARENT-CASE:

RELATED APPLICATIONS This is a continuation-in-part of application Ser. No. 08/986,832, filed Dec. 8, 1997 now abandoned.

US-CL-CURRENT: 600/9

ABSTRACT:

A method for beneficially restructuring water and its contents for consumptions by organisms. The method involves subjecting water for a period of time to an electromagnetic field of a specific flux density varying from 10.sup.-5 to 10.sup.-21 gauss and a specific frequency varying from 0 hertz to 300 hertz, depending on the intended subsequent use of the water. The specific flux density and the specific frequency is empirically determined to restructure the water such that the water beneficially affects the organism to which the water is subsequently applied.

16 Claims, 12 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 9

----- KWIC -----

Detailed Description Text - DETX:

In vacuo, the dominant force is the static force, and in condensed systems the dominant force is the radiated force. Moving from the gaseous state to the

liquid state the density of water is 1600 times greater, thus increasing the force between molecules accordingly. In renormalizing frequency electromagnetic field is trapped in the ground state while  $(mv)$  remains the same. When momentum  $(mv)$  is renormalized the trapped light will come out e.g., **bioluminescence**. Light will be emitted by biosystems (e.g. sono-luminescence) when sound waves are produced in the system. From the antinode of the stationary wave light is emitted. The frequency of the emitted light depends upon the liquid. Each liquid has its own frequency. Biosystems have many frequencies contained by the solvent. Collapsing **bubbles** affect temperature (a diabatic compression) in applying van der Waals equation,  $p$  molecules are excited and light is emitted.

US-PAT-NO: 6436682

DOCUMENT-IDENTIFIER: US 6436682 B1

TITLE: Luciferases, fluorescent proteins, nucleic acids encoding the luciferases and fluorescent proteins and the use thereof in diagnostics, high throughput screening and novelty items

DATE-ISSUED: August 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan; Bruce J.	Beverly Hills	CA	N/A	N/A
Szent-Gyorgyi; Christopher	Pittsburgh	PA	N/A	N/A

APPL-NO: 09/ 609161

DATE FILED: June 30, 2000

PARENT-CASE:

RELATED APPLICATIONS This application is a divisional of U.S. application Ser. No. 09/277,716, filed Mar. 26, 1999 to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "LUCIFERASES, FLUORESCENT PROTEINS, NUCLEIC ACIDS ENCODING THE LUCIFERASES AND FLUORESCENT PROTEINS AND THE USE THEREOF IN

DIAGNOSTICS, HIGH THROUGHPUT SCREENING AND NOVELTY ITEMS." Now U.S. Pat. No.

6,232,107, filed May 15, 2001. This application also claims priority to U.S.

provisional application Ser. No. 60/102,939, filed Oct. 1, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "LUCIFERASES, FLUORESCENT PROTEINS, NUCLEIC ACIDS ENCODING THE LUCIFERASES AND FLUORESCENT

PROTEINS AND THE USE THEREOF IN DIAGNOSTICS, HIGH THROUGHPUT SCREENING AND NOVELTY ITEMS".

Priority is also claimed to U.S. provisional application Serial No.

60/089,367, filed Jun. 15, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "GAUSSIA LUCIFERASE, NUCLEIC ACIDS ENCODING THE LUCIFERASE AND METHODS

USING THE LUCIFERASE", and to U.S. provisional application Serial No.

60/079,624, filed Mar. 27, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "RENILLA GREEN FLUORESCENT PROTEIN COMPOSITIONS AND METHODS."

Benefit

of priority to each of these applications is claimed under 35 U.S.C.

.sectn.119(e). This application is also related to subject matter in U.S.

application Ser. No. 08/757,046, filed Nov. 25, 1996, to Bruce Bryan entitled

"BIOLUMINESCENT NOVELTY ITEMS", now U.S. Pat. No. 5,876,995, issued Mar. 2, 1999, and in U.S. application Ser. No. 08/597,274, filed Feb. 6, 1996, to

Bruce Bryan, entitled "BIOLUMINESCENT NOVELTY ITEMS". This application is also related to U.S. application Ser. No. 08/908,909, filed Aug. 8, 1997, to

Bruce Bryan entitled "DETECTION AND VISUALIZATION OF NEOPLASTIC TISSUE AND OTHER TISSUES". The application is also related to U.S. application Ser. No. 08/990,103, filed Dec. 12, 1997, to Bruce Bryan entitled "APPARATUS AND METHODS FOR DETECTING AND IDENTIFYING INFECTIOUS AGENTS". The subject matter of each of the above noted U.S. applications and provisional applications is herein incorporated by reference in its entirety.

US-CL-CURRENT: 435/189; 124/74 ; 124/76 ; 222/1 ; 42/54 ; 435/183 ; 446/473

ABSTRACT:

Isolated and purified nucleic acid molecules that encode a luciferase from *Renilla mulleri*, *Gaussia* and *Pleuromamma*, and the proteins encoded thereby are provided. Isolated and purified nucleic acids encoding green fluorescent proteins from the genus *Renilla* and *Ptilosarcus*, and the green fluorescent proteins encoded thereby are also provided. Compositions and combinations comprising the green fluorescent proteins and/or the luciferase are further provided.

9 Claims, 14 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 11

----- KWIC -----

Brief Summary Text - BSTX:

Combinations containing a first composition containing a **luciferase** and a second composition containing one or more additional components of a **bioluminescence-generating** system for use with articles of manufacture to produce novelty items are provided. These novelty items are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; **bubbles in bubble** making toys and other toys that produce **bubbles**; balloons; figurines; personal items, such as cosmetics, bath powders, body lotions, gels, powders and creams, nail polishes, make-up, toothpastes and other dentifrices, soaps, body paints, and **bubble** bath; items such as inks, paper; foods, such as gelatins, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a **luciferase**; plant food containing a luciferin or **luciferase**, preferably a luciferin for use with transgenic plants that express **luciferase**; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

#### Brief Summary Text - BSTX:

Combinations containing a first composition containing a Renilla mulleri GFP or Ptilosarcus GFP or mixtures thereof and a second composition containing a **bioluminescence-generating** system for use with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; **bubbles in bubble** making toys and other toys that produce **bubbles**; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, cosmetics including make-up, toothpastes and other dentifrices, soaps, cosmetics, body paints, and **bubble** bath, **bubbles** made from non-detergent sources, particularly proteins such as albumin and other non-toxic proteins; in fishing lures, particularly cross-linked polyacrylamide containing a **fluorescent protein** and/or components of a **bioluminescence** generating system, which glow upon contact with water; items such as inks, paper; foods, such as gelatins, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a **luciferase**; plant food containing a luciferin or **luciferase**, preferably a luciferin for use with transgenic plants that express **luciferase**; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

#### Brief Summary Text - BSTX:

Kits containing the GFPs for use in the methods, including those described herein, are provided. In one embodiment, the kits containing an article of manufacture and appropriate reagents for generating **bioluminescence** are provided. The kits containing such soap compositions, with preferably a moderate pH [between 5 and 8] and **bioluminescence** generating reagents, including **luciferase** and luciferin and the GFP are provided herein. These kits, for example, can be used with a **bubble-blowing** or producing toy. These kits can also include a reloading or charging cartridge or can be used in connection with a food.

#### Detailed Description Text - DETX:

GFPs and/or BFPs or other such **fluorescent proteins** may be used in any of the novelty items and combinations provided herein, such as the beverages and toys, including **bubble** making toys, particularly **bubble-making** compositions or mixtures. Also of particular interest are the use of these proteins in cosmetics, particularly face paints or make-up, hair colorants or hair conditioners, mousses or other such products. Such systems are particularly of interest because no **luciferase** is needed to activate the **photoprotein** and



because the proteins are non-toxic and safe to apply to the skin, hair, eyes and to ingest. These fluorescent proteins may also be used in addition to bioluminescence generating systems to enhance or create an array of different colors.

#### Detailed Description Text - DETX:

In addition, the above-described Pleuromamma, Gaussia or Renilla luciferases and/or Renilla and Ptilosarcus GFPs can be used in combination with articles of manufacture to produce novelty items. Such items and methods for preparation are described in detail in copending U.S. application Ser. Nos. 08/597,274 and 08/757,046. The luciferases and/or GFPs provided herein may be used in the methods and items as provided in the copending applications. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; bubbles in bubble making toys and other toys that produce bubbles; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, cosmetics including make-up, toothpastes and other dentifrices, soaps, body paints, and bubble bath; items such as inks, paper; foods, such as gelatins, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a luciferase; plant food containing a luciferin or luciferase, preferably a luciferin for use with transgenic plants that express luciferase; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

#### Detailed Description Text - DETX:

In one embodiment, the kits contain appropriate reagents and an article of manufacture for generating bioluminescence in combination with the article. These kits, for example, can be used with a bubble-blowing or producing toy or with a squirt gun. These kits can also include a reloading or charging cartridge.

US-PAT-NO: 6247995

DOCUMENT-IDENTIFIER: US 6247995 B1

TITLE: Bioluminescent novelty items

DATE-ISSUED: June 19, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan; Bruce	Beverly Hills	CA	90210	N/A

APPL-NO: 08/ 597274

DATE FILED: February 6, 1996

US-CL-CURRENT: 446/473; 124/74 ; 124/76 ; 222/1 ; 42/54 ; 435/189

ABSTRACT:

Systems and apparatus for generating **bioluminescence**, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, include, toys, paints, slimy play material, textiles, particularly clothing, **bubbles in bubble** making toys and other toys that produce **bubbles**, balloons, personal items, such as bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and **bubble** bath, foods, such as gelatins, icings and frostings, beverages such as beer, wine, champagne, soft drinks, and ice cubes, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable formulation.

70 Claims, 19 Drawing figures

Exemplary Claim Number: 1,23

Number of Drawing Sheets: 5

----- KWIC -----

Abstract Text - ABTX:

Systems and apparatus for generating **bioluminescence**, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, include, toys,

paints, slimy play material, textiles, particularly clothing, bubbles in bubble making toys and other toys that produce bubbles, balloons, personal items, such as bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and bubble bath, foods, such as gelatins, icings and frostings, beverages such as beer, wine, champagne, soft drinks, and ice cubes, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable formulation.

#### Brief Summary Text - BSTX:

Systems and apparatus for generating bioluminescence, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, include, but are not limited to: toys, particularly squirt guns; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; bubbles in bubble making toys and other toys that produce bubbles; balloons; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, make-up, toothpastes and other dentifrices, soaps, body paints, and bubble bath; items such as inks, paper; foods, such as gelatins, icings and frostings; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

#### Brief Summary Text - BSTX:

Thus, the novelty items provided herein include but are not limited to: textiles that glow, ink that glows, paints, particularly fingerpaints, that glow, paper products that glow, toys, particularly squirt guns that eject a bioluminescent fluid, dolls and dummies with internal organs or parts that glow; foods and beverages that glow, soapy compositions for blowing bubbles that produce bubbles that glow, bubble bath compositions that produce bubbles that glow, fountains that spew glowing fluid, bioluminescent "fireworks", sparklers, magic-wand toy, and numerous other such items.

#### Detailed Description Text - DETX:

Novelty items are understood by those of skill in manufacture of such items as well as by the purchasing public and are intended herein to include items such as, toys, including toy guns, dolls, dummies, balloons, bubbles, "fairy dust", such as micronized lyophilized particles, puzzles, and inks and paints, particularly fingerpaints; theatrical vapors when mixed, for example with dry ice or a fog; souvenirs; textiles, particularly clothing, including T-shirts, hats, swimsuits, bathing suit, wet suits, scuba diving suits, surfing suits, and other water sport or sports attire; foods and beverages, including gelatins, ice cubes, beer, wine, champagne, soft drinks, ice creams, sorbets,

ices, frostings, and candy; jewelry, medallions, decorative articles, artificial flowers, articles for displaying names, business tradenames, slogans, trademarks on promotional or other such items, such as T-shirts, hats, paints, wrapping paper, gifts intended to promote business goodwill; personal items, such as body paints, body sprays, **bubble** baths, make-up, body lotions, dentifrices; fountains; jets or sprays of particles or fluids, including "fireworks", sparklers, and magic-wand toys, and many other such novelty items [see, e.g., U.S. Pat. Nos. 5,435,010, 5,460,022, 5,458,931, 5,435,787, 5,435,010, 5,432,623, 5,421,583, 5,419,558, 5,416,927, 5,413,454, 5,413,332, 5,411,427, 5,410,962, 5,407,691, 5,407,391, 5,405,958, 5,405,206, 5,400,698, 5,399,122, 5,398,972, 5,397,609, 5,396,408, 5,393,580, 5,390,086, 5,389,033, 5,383,684, 5,374,805, 5,368,518, 5,363,984, 5,360,010, 5,353,378, 5,351,931, 5,346,455, 5,341,538, 5,323,492, 5,283,911, 5,222,797, 5,177,812, 5,158,349, 4,924,358, 3,597,877 and many others, which describe types of items are considered novelty items]. Any such inanimate item that is combined with **bioluminescence** is intended to be encompassed herein.

#### Detailed Description Text - DETX:

This system is among the preferred systems for use herein. As will be evident, since the aequorin **photoprotein** includes noncovalently bound luciferin and molecular oxygen, it is suitable for storage in this form as a lyophilized powder or encapsulated into a selected delivery vehicle. The system can be encapsulated into pellets, such as liposomes or other delivery vehicles, or stored in single chamber dual or other multiple chamber apparatus. When used, the vehicles are contacted with a composition, even tap water, that contains Ca.sup.2+ [or other suitable metal ion], to produce a mixture that glows. This system is preferred for use in numerous embodiments herein, such as in any embodiment that uses pellets. These embodiments include, squirt guns, fairy dust, **bubble** toys, **bubble** baths, soaps, linked to textiles, for addition to beverages and foods.

#### Detailed Description Text - DETX:

Lyophilized mixtures, and compositions containing the Renilla **luciferase** are also provided. The **luciferase** or mixtures of the **luciferase** and luciferin may also be encapsulated into a suitable delivery vehicle, such as a liposome, glass particle, capillary tube, drug delivery vehicle, gelatin, time release coating or other such vehicle. Kits containing these mixtures, compositions, or vehicles and also a selected article of manufacture, such as a toy gun, **bubble** composition, balloon, item of clothing, personal item, are also provided. The **luciferase** may also be linked to a substrate, such as cotton, polyester, polyester-cotton blends, polypropylene, polyvinyltoluene, polyvinyl propylene, glass, ceramic, or plastics are provided in combination with or as part of an article of manufacture.

#### Detailed Description Text - DETX:

These mutant **luciferases** as well as the wild type **luciferases** are among those

preferred herein, particularly in instances when a variety of colors are desired or when stability at higher temperatures is desired. It is also noteworthy that firefly luciferases have alkaline pH optima [7.5-9.5], and, thus, are suitable for use in combination with articles of manufacture, such as the bubble compositions that have alkaline pH.

Detailed Description Text - DETX:

Addition of ATP and luciferin to a reaction that is exhausted produces additional light emission. Thus, the system, once established, is relatively easily maintained. Therefore, it is highly suitable for use herein in embodiments in which a sustained glow is desired or reuse of the item is contemplated. Thus, the components of a firefly system can be packaged with the item of manufacture, such as a toy gun, and then combined with the article before use. For example, the luciferin and ATP can be added to a mild bubble solution that contains luciferase each time the bubbles are used.

Detailed Description Text - DETX:

Because the bioluminescent system components are mixed within the entire bottle, those contents must be used shortly after mixing. Thus, this type of packaging is particularly suitable for use with bioluminescence systems that are consumed in a single use or activity such as bubble-blowing.

Detailed Description Text - DETX:

The bioluminescent systems provided herein are contemplated for use with various substances to glow the substance. For example, as discussed below, the bioluminescent system components may be used to produce glowing aqueous mixtures housed in transparent portions of articles of manufacture, thereby illuminating that portion of the article of manufacture. Additionally, the bioluminescent system components may be used to produce glowing food or beverage products, textiles, creams, lotions, gels, soaps, bubbles, papers, powders or water. Following are brief examples of combinations of bioluminescence systems with articles of manufacture and the resulting novelty items contemplated herein.

Detailed Description Text - DETX:

Suitable bath powders and bubble baths and other bubble compositions for use in these combinations are well known to those of skill in the art [see, eg., U.S. Pat. Nos.: 5,478,501 4,565,647; 5,478,490; 5,412,118; 5,401,773; and many other examples]. These may be modified by adding the bioluminescence generating system components.

Detailed Description Text - DETX:

Numerous toy guns and other toy weapons that shoot pellets or liquid, in addition to those exemplified herein, are suitable for use in combination with the **bioluminescent** generating systems herein. The toy weapons may be loaded with a solution containing microspheres of luciferin and/or **luciferase**, or with lyophilized luciferin/luciferin, or other mixtures as described herein.

Suitable toy weapons and devices that shoot jets or sprays of water are described in the following sampling of U.S. Pat. No. 5,462,469 [toy gun that shoots **bubbles**]; U.S. Pat. No. 5,448,984 [toy gun that shoots balls and water and can be modified to shoot light or temperature sensitive pellets, which should be stored under appropriate conditions or appropriately packaged, that release luciferin/luciferase when exposed to light]; U.S. Pat. Nos. 5,439,139; 5,427,320; 5,419,458; 5,381,928; 5,377,656; 5,373,975; 5,373,833 and 5,373,832 [which describe toy guns that rely upon a pressurizable bladder for release of air pressure to shoot a projectile, which can be modified to shoot projectiles of encapsulated luciferin/luciferase]; U.S. Pat. No. 5,370,278 [which describes liquid from a port mounted to a headband]; U.S. Pat. No. 5,366,108; 5,360,142 [which describes a supply and delivery assembly for use in combination with a pump type water gun or other water propelling device]; U.S. Pat. Nos. 5,346,418; 5,343,850 [which describes a projectile launcher for use in combination with the pellets provided herein]; U.S. Pat. Nos. 5,343,849; 5,339,987 [which describes water guns that have at least one pressurizable air/water storage tank, a pressurizing mechanism, a channel of release for shooting water and a release mechanism]; U.S. Pat. Nos. 5,326,303; 5,322,191; 5,305,919; 5,303,847 [which describes a device worn on a user's hand with sheaths for the tips of the fingers that includes a housing for a water reservoir, a water pump and electrical motor and a battery pack to be secured to the user's body]; U.S. Pat. Nos. 5,292,032; 5,284,274 [which describes an action toy system including a capsule for containing water, which will herein contain components of a **bioluminescence** generating system, having an orifice and a plunger and a spring loaded mechanism for driving the water from the orifice. The action toy may be configured as a shotgun accepting a plurality of prefilled shell capsules into its breechblock for firing through its barrel, as a missile launcher in which the capsules are mounted to the front of the launcher and the water is ejected directly from the capsule against the target, or as a crossbow with the bow loading the spring-loaded mechanism and a water stream obtained on release of the bow]; U.S. Pat. No. 5,284,272 [which describes a bottle and cap combination for spewing liquid]; U.S. Pat. Nos. 5,256,099; 5,244,153; 5,241,944; 5,238,149; 5,234,129; 5,224,625; 5,213,335; 4,854,480; 5,213,089; 5,184,755; 5,174,477; 5,150,819; 5,141,467; 5,141,462; 5,088,950; 5,071,387 [which describes a figurine-shaped water squirting toy]; U.S. Pat. No. 5,064,095 [which describes a water cannon apparatus]; U.S. Pat. Nos. 5,029,732; 5,004,444; 4,892,228; 4,867,208 [which describes an apparatus for storing and dispensing fluid under pressure]; U.S. Pat. Nos. 4,808,143; 4,784,293; 4,768,681; 4,733,799; 4,615,488 and many others. U.S. Pat. No. 5,415,151 describes a toy gun that launches projectiles that can be adapted for shooting the pellets, such as light sensitive pellets that are degraded upon exposure to light, provided herein.

#### Detailed Description Text - DETX:

Such compositions, preferably those that have near neutral pH, can be combined with the components of the **bioluminescence** generating systems provided herein.

In particular, a mixture of **luciferase** and luciferin, such as the Renilla system or firefly system or Cypridina system, preferably in the form of pellets or microspheres, such as liposomes or other time release capsule, can be added to the **bubble** mixture. When used, the air added to the mixture will cause a glow, or a glow will be produced as the contents of the pellets are released into the composition.

Detailed Description Text - DETX:

Kits containing such soap compositions, with preferably a moderate pH [between 5 and 8] and **bioluminescence** generating reagents, including **luciferase** and luciferin are provided herein. These kits can be used with **bubble-blowing** or producing toy.

Detailed Description Text - DETX:

FIGS. 12 and 13 illustrate a preferred embodiment of the bottle/bladder apparatus adapted for use with **bioluminescent bubble** compositions. This **bubble** composition bottle has a bladder 300 positioned within it and held in place, in the neck 302 of the bottle, by friction. A collar 304 is positioned on the neck of the bottle 302, preventing the cap 306 from being screwed completely onto the top of the bottle. The cap 306 contains a plunger 308 which operates to push the bladder 300 into the body of the bottle when the collar 304 is removed and the cap 306 is screwed down tightly. Upon entering the body of the bottle, the bladder is pierced by a piercing pin 310 located on the bottom of the bottle; thereby releasing the contents of the bladder into the bottle. FIG. 13 shows the bottle with the collar 304 removed, the cap 306 screwed on tightly, and the bladder 300 collapsed within it.

Detailed Description Text - DETX:

Component(s) [less than all] of the **bioluminescence** generating reaction are contained in the bladder. The components may be in the form of a solution, suspension, suspended particles, or particles. Prior to use the bottle may be gently agitated. The particles may be time release capsules that release their contents upon exposure to the **bubble** composition or from which the contents diffuse upon mixing of the contents of the bladder with the **bubble** composition. The remaining component(s), such as Ca.sup.2+ or ATP, are contained in the **bubble** composition 314, which is preferably a mild **bubble** forming composition. Selection of the **bioluminescence** generating composition depends upon the selected **bubble** composition and also the desired action. In other embodiments, remaining components, such as ATP, FMN, a flavin reductase or other component that may be somewhat sensitive to the **bubble** composition, of the **bioluminescence** generating system may be added to the **bubble** composition just prior to use.

Detailed Description Text - DETX:

The collar 304 of the bottle is adapted with a bubble blowing ring 312, with arm, integral thereto. Thus, the collar 304 is removed, the bladder 300 pierced within the bottle as described and the bubble blowing ring 312 dipped into the mixed composition, withdrawn and bioluminescent bubbles blown. A standard bubble blowing wand [arm with ring] may be used and/or provided in place of that depicted in FIG. 12.

Detailed Description Text - DETX:

The bottle 316 may be fabricated of any material ordinarily used for dispensing bubbles. It may be transparent or translucent to the bioluminescent light so that any glow in the bottle can be seen.



US-PAT-NO: 6232107

DOCUMENT-IDENTIFIER: US 6232107 B1

TITLE: Luciferases, fluorescent proteins, nucleic acids encoding the luciferases and fluorescent proteins and the use thereof in diagnostics, high throughput screening and novelty items

DATE-ISSUED: May 15, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan; Bruce J.	Beverly Hills	CA	90210	N/A
Szent-Gyorgyi; Christopher	Pittsburgh	PA	N/A	N/A

APPL-NO: 09/ 277716

DATE FILED: March 26, 1999

PARENT-CASE:

RELATED APPLICATIONS This application claims priority to U.S. provisional application Ser. No. 60/102,939, filed Oct. 1, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "LUCIFERASES, FLUORESCENT PROTEINS, NUCLEIC ACIDS ENCODING THE LUCIFERASES AND FLUORESCENT PROTEINS AND THE USE THEREOF IN DIAGNOSTICS, HIGH THROUGHPUT SCREENING AND NOVELTY ITEMS". Priority is also claimed to U.S. provisional application Ser. No.60/089,367, filed Jun. 15, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "GAUSSIA LUCIFERASE, NUCLEIC ACIDS ENCODING THE LUCIFERASE AND METHODS USING THE LUCIFERASE", and to U.S. provisional application Ser. No.60/079,624, filed Mar. 27, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "RENILLA GREEN FLUORESCENT PROTEIN COMPOSITIONS AND METHODS." For U.S. purposes, benefit of priority to each of these applications is claimed under 35 U.S.C. .sctn.119(e). This application is also related to subject matter in U.S. application Ser. No. 08/757,046, filed Nov. 25, 1996, to Bruce Bryan entitled "BIOLUMINESCENT NOVELTY ITEMS", now U.S. Pat. No. 5,876,995, issued Mar. 2, 1999, and in U.S. application Ser. No. 08/597,274, filed Feb. 6, 1996, to Bruce Bryan, entitled "BIOLUMINESCENT NOVELTY ITEMS". This application is also related to U.S. application Ser. No. 08/908,909, filed Aug. 8, 1997, to Bruce Bryan entitled "DETECTION AND VISUALIZATION OF NEOPLASTIC TISSUE AND OTHER TISSUES". The application is also related to U.S. application Ser. No. 08/990,103, filed Dec. 12, 1997, to Bruce Bryan entitled "APPARATUS AND METHODS FOR DETECTING AND IDENTIFYING INFECTIOUS AGENTS". The subject matter of each of the above noted U.S. applications and provisional applications is herein incorporated by reference in its entirety.

US-CL-CURRENT: 435/189; 435/183 ; 435/252.2 ; 435/320.1 ; 435/6 ; 435/69.1 ; 435/8

## ABSTRACT:

Isolated and purified nucleic acid molecules that encode a luciferase from *Renilla mulleri*, *Gaussia* and *Pleuromamma*, and the proteins encoded thereby are provided. Isolated and purified nucleic acids encoding green fluorescent proteins from the genus *Renilla* and *Ptilosarcus*, and the green fluorescent proteins encoded thereby are also provided. Compositions and combinations comprising the green fluorescent proteins and/or the luciferase are further provided.

63 Claims, 14 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 11

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## Brief Summary Text - BSTX:

Combinations containing a first composition containing a **luciferase** and a second composition containing one or more additional components of a **bioluminescence-generating** system for use with articles of manufacture to produce novelty items are provided. These novelty items are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; **bubbles in bubble** making toys and other toys that produce **bubbles**; balloons; figurines; personal items, such as cosmetics, bath powders, body lotions, gels, powders and creams, nail polishes, make-up, toothpastes and other dentifrices, soaps, body paints, and **bubble** bath; items such as inks, paper; foods, such as gelatins, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a **luciferase**; plant food containing a luciferin or **luciferase**, preferably a luciferin for use with transgenic plants that express **luciferase**; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

## Brief Summary Text - BSTX:

Combinations containing a first composition containing a *Renilla mulleri* GFP or *Ptilosarcus* GFP or mixtures thereof and a second composition containing a **bioluminescence-** generating system for use with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns,

toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; **bubbles in bubble** making toys and other toys that produce **bubbles**; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, cosmetics including make-up, toothpastes and other dentifrices, soaps, cosmetics, body paints, and **bubble** bath, **bubbles** made from non-detergent sources, particularly proteins such as albumin and other non-toxic proteins; in fishing lures, particularly crosslinked polyacrylamide containing a **fluorescent protein** and/or components of a **bioluminescence** generating system, which glow upon contact with water; items such as inks, paper; foods, such as gelatins, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a **luciferase**; plant food containing a luciferin or **luciferase**, preferably a luciferin for use with transgenic plants that express **luciferase**; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

#### Brief Summary Text - BSTX:

Kits containing the GFPs for use in the methods, including those described herein, are provided. In one embodiment, the kits containing an article of manufacture and appropriate reagents for generating **bioluminescence** are provided. The kits containing such soap compositions, with preferably a moderate Ph [between 5 and 8] and **bioluminescence** generating reagents, including **luciferase** and luciferin and the GFP are provided herein. These kits, for example, can be used with a **bubble-blowing** or producing toy. These kits can also include a reloading or charging cartridge or can be used in connection with a food.

#### Detailed Description Text - DETX:

GFPs and/or BFPs or other such **fluorescent proteins** may be used in any of the novelty items and combinations provided herein, such as the beverages and toys, including **bubble** making toys, particularly **bubble-making** compositions or mixtures. Also of particular interest are the use of these proteins in cosmetics, particularly face paints or make-up, hair colorants or hair conditioners, mousses or other such products. Such systems are particularly of interest because no **luciferase** is needed to activate the **photoprotein** and because the proteins are non-toxic and safe to apply to the skin, hair, eyes and to ingest. These **fluorescent proteins** may also be used in addition to **bioluminescence** generating systems to enhance or create an array of different colors.

#### Detailed Description Text - DETX:

In addition, the above-described Pleuromamma, Gaussia or Renilla **luciferases**

and/or Renilla and Ptilosarcus GFPs can be used in combination with articles of manufacture to produce novelty items. Such items and methods for preparation are described in detail in copending U.S. application Ser. Nos. 08/597,274 and 08/757,046. The luciferases and/or GFPs provided herein may be used in the methods and items as provided in the copending applications. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; bubbles in bubble making toys and other toys that produce bubbles; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, cosmetics including make-up, toothpastes and other dentifrices, soaps, body paints, and bubble bath; items such as inks, paper; foods, such as gelatins, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a luciferase; plant food containing a luciferin or luciferase, preferably a luciferin for use with transgenic plants that express luciferase; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

#### Detailed Description Text - DETX:

In one embodiment, the kits contain appropriate reagents and an article of manufacture for generating bioluminescence in combination with the article. These kits, for example, can be used with a bubble-blowing or producing toy or with a squirt gun. These kits can also include a reloading or charging cartridge.

US-PAT-NO: 6152358

DOCUMENT-IDENTIFIER: US 6152358 A

TITLE: Bioluminescent novelty items

DATE-ISSUED: November 28, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan; Bruce	Beverly Hills	CA	90210	N/A

APPL-NO: 09/ 135988

DATE FILED: August 17, 1998

PARENT-CASE:

RELATED APPLICATIONS This application is a continuation-in-part of U.S. application Ser. No. 08/757,046 to Bruce Bryan, filed Nov. 25, 1996, entitled "BIOLUMINESCENT NOVELTY ITEMS,"now U.S. Pat. No. 5,876,995. This application is also a continuation-in-part of U.S. application Ser. No. 08/597,274 to Bruce Bryan, filed Feb. 6, 1996, entitled "BIOLUMINESCENT NOVELTY ITEMS". U.S. application Ser. No. 08/757,046 is a continuation-in-part of U.S. application Ser. No. 08/597,274. The subject matter of each of U.S. application Ser. No. 08/597,274 and U.S. application Ser. No. 08/757,046 is herein incorporated in its entirety by reference thereto. The disclosures of each of the above noted applications and provisional application is incorporated herein by reference thereto.

US-CL-CURRENT: 229/87.19; 435/189 ; 493/955

ABSTRACT:

Novelty items that are combinations of articles of manufacture with **bioluminescence** generating systems and/or **fluorescent proteins** are provided.. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include toys, paints, slimy play material, textiles, particularly clothing, **bubbles in bubble** making toys and other toys that produce **bubbles**, balloons, personal items, such as cosmetics, bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and **bubble** bath, foods, such as gelatins, icings and frostings, beverages such as beer, wine, champagne, soft drinks, and glowing ice, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable formulation.

58 Claims, 34 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 9

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Abstract Text - ABTX:

Novelty items that are combinations of articles of manufacture with bioluminescence generating systems and/or fluorescent proteins are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include toys, paints, slimy play material, textiles, particularly clothing, bubbles in bubble making toys and other toys that produce bubbles, balloons, personal items, such as cosmetics, bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and bubble bath, foods, such as gelatins, icings and frostings, beverages such as beer, wine, champagne, soft drinks, and glowing ice, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable formulation.

Brief Summary Text - BSTX:

Systems and apparatus for generating bioluminescence, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; bubbles in bubble making toys and other toys that produce bubbles; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, make-up, toothpastes and other dentifrices, soaps, body paints, and bubble bath; items such as inks, paper; foods, such as gelatins, popcorn, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a luciferase; plant food containing a luciferin or luciferase, preferably a luciferin for use with transgenic plants that express luciferase; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

Brief Summary Text - BSTX:

Thus, the novelty items provided herein include but are not limited to: textiles that glow, ink that glows, paints, particularly fingerpaints, that glow, paper products that glow, toys, particularly reloadable squirt guns that eject a bioluminescent fluid, dolls and dummies with internal organs or parts

that glow, figurines and novelty items that glow; toy "cigarettes" that produce glowing "smoke" upon exhalation, toy eggs with glowing yolks and/or whites, toy footbags that glow and toy board and card games with glowing parts, such as glowing cards, dice, game boards, etc.; foods and beverages that glow, soapy compositions for blowing bubbles that produce bubbles that glow, bubble bath compositions that produce bubbles that glow, fountains that expel glowing fluid, bioluminescent "fireworks", sparklers, magic-wand toys, and numerous other such items. Food containing a luciferin for use with plants and animals that express luciferase, such as transgenic fish, then when fed a food containing an appropriate substrate glow, is also contemplated herein.

#### Detailed Description Text - DETX:

Novelty items are understood by those of skill in manufacture of such items as well as by the purchasing public and are intended herein to include items, such as, toys, including toy guns, dolls, dummies, figurines, balloons, bubbles, "fairy dust", such as micronized lyophilized particles, puzzles, and inks and paints, particularly fingerpaints; theatrical vapors when mixed, for example with dry ice or a fog; souvenirs; textiles, particularly clothing, including T-shirts, hats, swimsuits, bathing suit, wet suits, scuba diving suits, surfing suits, and other water sport or sports attire; foods and beverages, including gelatins, ice cubes and ice in other shapes, beer, wine, champagne, soft drinks, ice creams, sorbets, ices, frostings, and candy; jewelry, medallions, decorative articles, artificial flowers, articles for displaying names, business tradenames, slogans, trademarks on promotional or other such items, such as T-shirts, hats, paints, wrapping paper, gifts intended to promote business goodwill; personal items, such as body paints, body sprays, bubble baths, make-up, body lotions, dentifrices; fountains; jets or sprays of particles or fluids, including "fireworks", sparklers, and magic-wand toys, and many other such novelty items [see, e.g., U.S. Pat. Nos. 5,435,010, 5,460,022, 5,458,931, 5,435,787, 5,435,010, 5,432,623, 5,421,583, 5,419,558, 5,416,927, 5,413,454, 5,413,332, 5,411,427, 5,410,962, 5,407,691, 5,407,391, 5,405,958, 5,405,206, 5,400,698, 5,399,122, 5,398,972, 5,397,609, 5,396,408, 5,393,580, 5,390,086, 5,389,033, 5,383,684, 5,374,805, 5,368,518, 5,363,984, 5,360,010, 5,353,378, 5,351,931, 5,346,455, 5,341,538, 5,323,492, 5,283,911, 5,222,797, 5,177,812, 5,158,349, 4,924,358, 3,597,877 and many others, which describe types of items are considered novelty items]. Any such inanimate item that is combined with bioluminescence is intended to be encompassed herein.

#### Detailed Description Text - DETX:

This system is among the preferred systems for use herein. As will be evident, since the aequorin photoprotein includes noncovalently bound luciferin and molecular oxygen, it is suitable for storage in this form as a lyophilized powder or encapsulated into a selected delivery vehicle. The system can be encapsulated into pellets, such as liposomes or other delivery vehicles, or stored in single chamber dual or other multiple chamber apparatus. When used, the vehicles are contacted with a composition, even tap water, that contains  $\text{Ca}^{2+}$  [or other suitable metal ion], to produce a mixture that glows. This system is preferred for use in numerous embodiments herein, such as in any embodiment that uses pellets. These embodiments include, squirt guns, fairy

dust, bubble toys, bubble baths, soaps, linked to textiles, for addition to beverages and foods.

Detailed Description Text - DETX:

Lyophilized mixtures, and compositions containing the Renilla luciferase are also provided. The luciferase or mixtures of the luciferase and luciferin may also be encapsulated into a suitable delivery vehicle, such as a liposome, glass particle, capillary tube, drug delivery vehicle, gelatin, time release coating or other such vehicle. Kits containing these mixtures, compositions, or vehicles and also a selected article of manufacture, such as a toy gun, bubble composition, balloon, item of clothing, personal item, are also provided. The luciferase may also be linked to a substrate, such as cotton, polyester, polyester-cotton blends, polypropylene, polyvinyltoluene, polyvinyl propylene, glass, ceramic, or plastics are provided in combination with or as part of an article of manufacture.

Detailed Description Text - DETX:

These mutant luciferases as well as the wild type luciferases are among those preferred herein, particularly in instances when a variety of colors are desired or when stability at higher temperatures is desired. It is also noteworthy that firefly luciferases have alkaline pH optima [7.5-9.5], and, thus, are suitable for use in combination with articles of manufacture, such as the bubble compositions that have alkaline pH.

Detailed Description Text - DETX:

Addition of ATP and luciferin to a reaction that is exhausted produces additional light emission. Thus, the system, once established, is relatively easily maintained. Therefore, it is highly suitable for use herein in embodiments in which a sustained glow is desired or reuse of the item is contemplated. Thus, the components of a firefly system can be packaged with the item of manufacture, such as a toy gun, and then combined with the article before use. For example, the luciferin and ATP can be added to a mild bubble or a protein composition that contains luciferase each time the bubbles are used.

Detailed Description Text - DETX:

GFPs and/or BFPs or other such fluorescent proteins may be used in any of the novelty items and combinations provided herein, such as the beverages and toys, including bubble making toys, particularly bubble-making compositions or mixtures and cosmetics. Such systems are particularly of interest because no luciferase is needed to activate the photoprotein and because the proteins are readily digested. These fluorescent proteins may also be used in addition to bioluminescence generating systems to enhance or create an array of different colors.



Detailed Description Text - DETX:

Attachment of phycobiliproteins to solid support matrices is known (e.g., see U.S. Pat. Nos. 4,714,682; 4,767,206; 4,774,189 and 4,867,908). Therefore, phycobiliproteins may be coupled to microcarriers coupled to one or more components of the **bioluminescent** reaction, preferably a **luciferase**, to convert the wavelength of the light generated from the **bioluminescent** reaction. Microcarriers coupled to one or more phycobiliproteins may be used in any of the novelty items and combinations provided herein, such as the multicolor beverages and toys, including **bubble** making toys, particularly **bubble-making** compositions or mixtures.

Detailed Description Text - DETX:

Because the **bioluminescence** generating system components are mixed within the entire bottle, those contents must be used shortly after mixing. Thus, this type of packaging is particularly suitable for use with **bioluminescence** systems that are consumed in a single use or activity such as **bubble-blowing**.

Detailed Description Text - DETX:

The **bioluminescence** generating systems provided herein are contemplated for use with various substances to glow the substance. For example, as discussed below, the **bioluminescence** generating system components may be used to produce glowing aqueous mixtures housed in transparent portions of articles of manufacture, thereby illuminating that portion of the article of manufacture. Additionally, the **bioluminescence** generating system components may be used to produce glowing food or beverage products, textiles, creams, lotions, gels, soaps, **bubbles**, papers, powders or water. Following are brief examples of combinations of **bioluminescence** systems with articles of manufacture and the resulting novelty items contemplated herein.

Detailed Description Text - DETX:

Suitable bath powders and **bubble** baths and other **bubble** compositions for use in these combinations are well known to those of skill in the art [see, e.g., U.S. Pat. Nos.: 5,478,501 4,565,647; 5,478,490; 5,412,118; 5,401,773; and many other examples]. These may be modified by adding the **bioluminescence** generating system components.

Detailed Description Text - DETX:

Examples of uses of the **bioluminescence** generating systems in toys include illumination of dolls, toy vehicles, hula hoops, yo-yos, balloons, immersible **bubble** generating toys, such as a toy submarine that blows glowing **bubbles**, and any other toy amenable to having a generally translucent covering defining a

space for containment of the bioluminescence generating system and addition of the final ingredients necessary for the illumination reaction. Also contemplated herein are toys that eject or spew a fluid. For example, toy or game projectiles are contemplated that contain a luciferase and bioluminescence substrate in an oxygen-free environment. The projectiles rupture upon impact with a hard surface thereby exposing the contents to moisture in the air that contains dissolved oxygen, the bioluminescence activator, and causing reaction.

#### Detailed Description Text - DETX:

Numerous toy guns and other toy weapons that shoot pellets or liquid, in addition to those exemplified herein, are suitable for use in combination with the bioluminescence generating systems herein. The toy weapons may be loaded with a composition containing microspheres of luciferin and/or luciferase, or with lyophilized luciferin/luciferin, or other mixtures as described herein. Suitable toy weapons and devices that shoot jets or sprays of water are described in the following sampling of U.S. Pat. Nos. 5,462,469 [toy gun that shoots bubbles]; 5,448,984 [toy gun that shoots balls and water and can be modified to shoot light or temperature sensitive pellets, which should be stored under appropriate conditions or appropriately packaged, that release luciferin/luciferase when exposed to light]; 5,439,139; 5,427,320; 5,419,458; 5,381,928; 5,377,656; 5,373,975; 5,373,833 and 5,373,832 [which describe toy guns that rely upon a pressurizable bladder for release of air pressure to shoot a projectile, which can be modified to shoot projectiles of encapsulated luciferin/luciferase]; 5,370,278 [which describes liquid from a port mounted to a headband]; 5,366,108; 5,360,142 [which describes a supply and delivery assembly for use in combination with a pump type water gun or other water propelling device]; 5,346,418; 5,343,850 [which describes a projectile launcher for use in combination with the pellets provided herein]; 5,343,849; 5,339,987 [which describes water guns that have at least one pressurizable air/water storage tank, a pressurizing mechanism, a channel of release for shooting water and a release mechanism]; 5,326,303; 5,322,191; 5,305,919; 5,303,847 [which describes a device worn on a user's hand with sheaths for the tips of the fingers that includes a housing for a water reservoir, a water pump and electrical motor and a battery pack to be secured to the user's body]; 5,292,032; 5,284,274 [which describes an action toy system including a capsule for containing water, which will herein contain components of a bioluminescence generating system, having an orifice and a plunger and a spring loaded mechanism for driving the water from the orifice. The action toy may be configured as a shotgun accepting a plurality of prefilled shell capsules into its breechblock for firing through its barrel, as a missile launcher in which the capsules are mounted to the front of the launcher and the water is ejected directly from the capsule against the target, or as a crossbow with the bow loading the spring-loaded mechanism and a water stream obtained on release of the bow]; 5,284,272 [which describes a bottle and cap combination for spewing liquid]; 5,256,099; 5,244,153; 5,241,944; 5,238,149; 5,234,129; 5,224,625; 5,213,335; 4,854,480; 5,213,089; 5,184,755; 5,174,477; 5,150,819; 5,141,467; 5,141,462; 5,088,950; 5,071,387 [which describes a figurine-shaped water squirting toy]; 5,064,095 [which describes a water cannon apparatus]; 5,029,732; 5,004,444; 4,892,228; 4,867,208 [which describes an apparatus for storing and dispensing fluid under pressure]; 4,808,143; 4,784,293; 4,768,681; 4,733,799; 4,615,488 and many others. U.S. Pat. No. 5,415,151 describes a

toy gun that launches projectiles that can be adapted for shooting the pellets, such as light sensitive pellets that are degraded upon exposure to light, provided herein.

Detailed Description Text - DETX:

Such compositions, preferably those that have near neutral pH, can be combined with the components of the bioluminescence generating systems provided herein. In particular, a mixture of luciferase and luciferin, such as the Renilla system or firefly system or Cypridina system, preferably in the form of pellets or microspheres, such as liposomes or other time release capsule, can be added to the bubble mixture. When used, the air added to the mixture will cause a glow, or a glow will be produced as the contents of the pellets are released into the composition. Alternatively, one or more component of the bioluminescence generating system may be added to the bubble making composition, such as, for example, a luciferase and any necessary activators, and the remaining component(s), e.g., a luciferin, may be directly applied to bubbles using a fine spray from an atomizer or other suitable spray or misting means.

Detailed Description Text - DETX:

In addition, a fluorescent protein, such as GFP, BFP or a phycobiliprotein, may be added to the bubble-making composition and then illuminated using an external light source. For example, bubbles containing a fluorescent protein may be produced in a room illuminated with light of an appropriate wavelength to cause the fluorescent protein to fluoresce.

Detailed Description Text - DETX:

Alternatively, the fluorescent protein may be added to the bubble-making composition containing all the components of the bioluminescence generating system to effect a change of the color of the bubbles. For example, the fluorescent proteins may be added to the bubble-making composition directly or may be added in time-released or slowly-dissolving microspheres or liposomes, such that release of a fluorescent protein in the bubble composition, such as, for example, GFP or a phycobiliprotein, introduces a change in the color of the bubbles. It is particularly advantageous to have the fluorescent protein released into the composition after the container has been opened and used. A single bottle of bubble-making solution will be amenable to the production of more than one color of bubbles. For example, microparticles or liposomes susceptible to breakdown by exposure to air or by agitation by the wand or stick used for blowing bubbles are of particular interest.

Detailed Description Text - DETX:

Kits containing such soap compositions, with preferably a moderate pH [between 5 and 8] and bioluminescence generating reagents, including luciferase and

luciferin and the **fluorescent protein** are provided herein. These kits, for example, can be used with a **bubble-blowing** or producing toy. These kits can also include a reloading or charging cartridge, such as the cartridges provided herein.

Detailed Description Text - DETX:

FIGS. 12 and 13 illustrate a preferred embodiment of the bottle/bladder apparatus adapted for use with **bioluminescent bubble** compositions. This **bubble** composition bottle has a bladder 300 positioned within it and held in place, in the neck 302 of the bottle, by friction. A collar 304 is positioned on the neck of the bottle 302, preventing the cap 306 from being screwed completely onto the top of the bottle. The cap 306 contains a plunger 308 which operates to push the bladder 300 into the body of the bottle when the collar 304 is removed and the cap 306 is screwed down tightly. Upon entering the body of the bottle, the bladder is pierced by a piercing pin 310 located on the bottom of the bottle; thereby releasing the contents of the bladder into the bottle. FIG. 13 shows the bottle with the collar 304 removed, the cap 306 screwed on tightly, and the bladder 300 collapsed within it.

Detailed Description Text - DETX:

Component(s) [less than all] of the **bioluminescence** generating reaction are contained in the bladder. The components may be in the form of a solution, suspension, suspended particles, or particles. Prior to use the bottle may be gently agitated. The particles may be time release capsules that release their contents upon exposure to the **bubble** composition or from which the contents diffuse upon mixing of the contents of the bladder with the **bubble** composition. The remaining component(s), such as Ca.sup.2+ or ATP, are contained in the **bubble** composition 314, which is preferably a mild **bubble** forming composition. Selection of the **bioluminescence** generating composition depends upon the selected **bubble** composition and also the desired action. In other embodiments, remaining components, such as ATP, FMN, a flavin reductase or other component that may be somewhat sensitive to the **bubble** composition, of the **bioluminescence** generating system may be added to the **bubble** composition just prior to use.

Detailed Description Text - DETX:

The collar 304 of the bottle is adapted with a **bubble** blowing ring 312, with arm, integral thereto. Thus, the collar 304 is removed, the bladder 300 pierced within the bottle as described and the **bubble** blowing ring 312 dipped into the mixed composition, withdrawn and **bioluminescent bubbles** blown. A standard **bubble** blowing wand [arm with ring] may be used and/or provided in place of that depicted in FIG. 12.

Detailed Description Text - DETX:

The bottle 316 may be fabricated of any material ordinarily used for dispensing **bubbles**. It may be transparent or translucent to the **bioluminescent** light so that any glow in the bottle can be seen.

US-PAT-NO: 6113886

DOCUMENT-IDENTIFIER: US 6113886 A

TITLE: Bioluminescent novelty items

DATE-ISSUED: September 5, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan; Bruce	Beverly Hills	CA	90210	N/A

APPL-NO: 09/ 447208

DATE FILED: November 22, 1999

PARENT-CASE:

RELATED APPLICATIONS This application is a divisional of U.S. application Ser. No. 09/135,988 to Bruce Bryan, filed Aug. 17, 1998, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also continuation-in-part of U.S. application Ser. No. 08/757,046, now U.S. Pat. No. 5,876,995, to Bruce Bryan, filed Nov. 25, 1996, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also a continuation-in-part of U.S. application Ser. No. 08/597,274, now allowed, to Bruce Bryan, filed Feb. 6, 1996, entitled "BIOLUMINESCENT NOVELTY ITEMS". U.S. Pat. No. 09/135,988 is a continuation-in-part of U.S. application Ser. No. 08/757,046, which is a continuation-in-part of U.S. application Ser. No. 08/597,274. The subject matter of each of U.S. application Ser. Nos. 09/135,988, 08/597,274 and 08/757,046 is herein incorporated in its entirety by reference thereto. This application is also related to provisional application Ser. Nos. 60/079,624 and 60/089,367. The disclosures of each of the above noted applications and provisional applications is incorporated herein by reference thereto.

US-CL-CURRENT: 424/49; 424/63 ; 424/64 ; 424/69 ; 424/70.1 ; 424/70.6 ; 424/70.7 ; 424/78.02 ; 424/94.4 ; 435/189 ; 510/119 ; 510/135 ; 510/392 ; 510/481

ABSTRACT:

Novelty items that are combinations of articles of manufacture with **bioluminescence** generating systems and/or **fluorescent proteins** are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include toys, personal items, such as cosmetics, bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and **bubble** bath, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other formulations.

30 Claims, 34 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 9

----- KWIC -----

Abstract Text - ABTX:

Novelty items that are combinations of articles of manufacture with bioluminescence generating systems and/or fluorescent proteins are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include toys, personal items, such as cosmetics, bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and bubble bath, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other formulations.

Brief Summary Text - BSTX:

Systems and apparatus for generating bioluminescence, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; bubbles in bubble making toys and other toys that produce bubbles; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, make-up, toothpastes and other dentifrices, soaps, body paints, and bubble bath; items such as inks, paper; foods, such as gelatins, popcorn, icings and frostings; fish

Brief Summary Text - BSTX:

Thus, the novelty items provided herein include but are not limited to: textiles that glow, ink that glows, paints, particularly fingerpaints, that glow, paper products that glow, toys, particularly reloadable squirt guns that eject a bioluminescent fluid, dolls and dummies with internal organs or parts that glow, figurines and novelty items that glow; toy "cigarettes" that produce glowing "smoke" upon exhalation, toy eggs with glowing yolks and/or whites, toy footbags that glow and toy board and card games with glowing parts, such as glowing cards, dice, game boards, etc.; foods and beverages that glow, soapy compositions for blowing bubbles that produce bubbles that glow, bubble bath compositions that produce bubbles that glow, fountains that expel glowing fluid, bioluminescent "fireworks", sparklers, magic-wand toys, and numerous

other such items. Food containing a luciferin for use with plants and animals that express luciferase, such as transgenic fish, then when fed a food containing an appropriate substrate glow, is also contemplated herein.

#### Detailed Description Text - DETX:

Novelty items are understood by those of skill in manufacture of such items as well as by the purchasing public and are intended herein to include items, such as, toys, including toy guns, dolls, dummies, figurines, balloons, bubbles, "fairy dust", such as micronized lyophilized particles, puzzles, and inks and paints, particularly fingerpaints; theatrical vapors when mixed, for example with dry ice or a fog; souvenirs; textiles, particularly clothing, including T-shirts, hats, swimsuits, bathing suit, wet suits, scuba diving suits, surfing suits, and other water sport or sports attire; foods and beverages, including gelatins, ice cubes and ice in other shapes, beer, wine, champagne, soft drinks, ice creams, sorbets, ices, frostings, and candy; jewelry, medallions, decorative articles, artificial flowers, articles for displaying names, business trade names, slogans, trademarks on promotional or other such items, such as T-shirts, hats, paints, wrapping paper, gifts intended to promote business goodwill; personal items, such as body paints, body sprays, bubble baths, make-up, body lotions, dentifrices; fountains; jets or sprays of particles or fluids, including "fireworks", sparklers, and magic-wand toys, and many other such novelty items [see, e.g., U.S. Pat. Nos. 5,435,010, 5,460,022, 5,458,931, 5,435,787, 5,435,010, 5,432,623, 5,421,583, 5,419,558, 5,416,927, 5,413,454, 5,413,332, 5,411,427, 5,410,962, 5,407,691, 5,407,391, 5,405,958, 5,405,206, 5,400,698, 5,399,122, 5,398,972, 5,397,609, 5,396,408, 5,393,580, 5,390,086, 5,389,033, 5,383,684, 5,374,805, 5,368,518, 5,363,984, 5,360,010, 5,353,378, 5,351,931, 5,346,455, 5,341,538, 5,323,492, 5,283,911, 5,222,797, 5,177,812, 5,158,349, 4,924,358, 3,597,877 and many others, which describe types of items are considered novelty items]. Any such inanimate item that is combined with bioluminescence is intended to be encompassed herein.

#### Detailed Description Text - DETX:

This system is among the preferred systems for use herein. As will be evident, since the aequorin photoprotein includes noncovalently bound luciferin and molecular oxygen, it is suitable for storage in this form as a lyophilized powder or encapsulated into a selected delivery vehicle. The system can be encapsulated into pellets, such as liposomes or other delivery vehicles, or stored in single chamber dual or other multiple chamber apparatus. When used, the vehicles are contacted with a composition, even tap water, that contains  $\text{Ca}^{2+}$  [or other suitable metal ion], to produce a mixture that glows. This system is preferred for use in numerous embodiments herein, such as in any embodiment that uses pellets. These embodiments include, squirt guns, fairy dust, bubble toys, bubble baths, soaps, linked to textiles, for addition to beverages and foods.

#### Detailed Description Text - DETX:

Lyophilized mixtures, and compositions containing the Renilla luciferase are



also provided. The luciferase or mixtures of the luciferase and luciferin may also be encapsulated into a suitable delivery vehicle, such as a liposome, glass particle, capillary tube, drug delivery vehicle, gelatin, time release coating or other such vehicle. Kits containing these mixtures, compositions, or vehicles and also a selected article of manufacture, such as a toy gun, bubble composition, balloon, item of clothing, personal item, are also provided. The luciferase may also be linked to a substrate, such as cotton, polyester, polyester-cotton blends, polypropylene, polyvinyltoluene, polyvinyl propylene, glass, ceramic, or plastics are provided in combination with or as part of an article of manufacture.

#### Detailed Description Text - DETX:

These mutant luciferases as well as the wild type luciferases are among those preferred herein, particularly in instances when a variety of colors are desired or when stability at higher temperatures is desired. It is also noteworthy that firefly luciferases have alkaline pH optima [7.5-9.5], and, thus, are suitable for use in combination with articles of manufacture, such as the bubble compositions that have alkaline pH.

#### Detailed Description Text - DETX:

Addition of ATP and luciferin to a reaction that is exhausted produces additional light emission. Thus, the system, once established, is relatively easily maintained. Therefore, it is highly suitable for use herein in embodiments in which a sustained glow is desired or reuse of the item is contemplated. Thus, the components of a firefly system can be packaged with the item of manufacture, such as a toy gun, and then combined with the article before use. For example, the luciferin and ATP can be added to a mild bubble or a protein composition that contains luciferase each time the bubbles are used.

#### Detailed Description Text - DETX:

GFPs and/or BFPs or other such fluorescent proteins may be used in any of the novelty items and combinations provided herein, such as the beverages and toys, including bubble making toys, particularly bubble-making compositions or mixtures and cosmetics. Such systems are particularly of interest because no luciferase is needed to activate the photoprotein and because the proteins are readily digested. These fluorescent proteins may also be used in addition to bioluminescence generating systems to enhance or create an array of different colors.

#### Detailed Description Text - DETX:

Attachment of phycobiliproteins to solid support matrices is known (e.g., see U.S. Pat. Nos. 4,714,682; 4,767,206; 4,774,189 and 4,867,908). Therefore, phycobiliproteins may be coupled to microcarriers coupled to one or more

components of the **bioluminescent** reaction, preferably a **luciferase**, to convert the wavelength of the light generated from the **bioluminescent** reaction. Microcarriers coupled to one or more phycobiliproteins may be used in any of the novelty items and combinations provided herein, such as the multicolor beverages and toys, including **bubble** making toys, particularly **bubble-making** compositions or mixtures.

Detailed Description Text - DETX:

Because the **bioluminescence** generating system components are mixed within the entire bottle, those contents must be used shortly after mixing. Thus, this type of packaging is particularly suitable for use with **bioluminescence** systems that are consumed in a single use or activity such as **bubble-blowing**.

Detailed Description Text - DETX:

The **bioluminescence** generating systems provided herein are contemplated for use with various substances to glow the substance. For example, as discussed below, the **bioluminescence** generating system components may be used to produce glowing aqueous mixtures housed in transparent portions of articles of manufacture, thereby illuminating that portion of the article of manufacture. Additionally, the **bioluminescence** generating system components may be used to produce glowing food or beverage products, textiles, creams, lotions, gels, soaps, **bubbles**, papers, powders or water. Following are brief examples of combinations of **bioluminescence** systems with articles of manufacture and the resulting novelty items contemplated herein.

Detailed Description Text - DETX:

Suitable bath powders and **bubble** baths and other **bubble** compositions for use in these combinations are well known to those of skill in the art [see, e.g., U.S. Pat. Nos.: 5,478,501 4,565,647; 5,478,490; 5,412,118; 5,401,773; and many other examples]. These may be modified by adding the **bioluminescence** generating system components.

Detailed Description Text - DETX:

Examples of uses of the **bioluminescence** generating systems in toys include illumination of dolls, toy vehicles, hoola hoops, yo-yos, balloons, immersible **bubble** generating toys, such as a toy submarine that blows glowing **bubbles**, and any other toy amenable to having a generally translucent covering defining a space for containment of the **bioluminescence** generating system and addition of the final ingredients necessary for the illumination reaction. Also contemplated herein are toys that eject or spew a fluid. For example, toy or game projectiles are contemplated that contain a **luciferase and bioluminescence** substrate in an oxygen-free environment. The projectiles rupture upon impact with a hard surface thereby exposing the contents to moisture in the air that contains dissolved oxygen, the **bioluminescence** activator, and causing reaction.

#### Detailed Description Text - DETX:

Numerous toy guns and other toy weapons that shoot pellets or liquid, in addition to those exemplified herein, are suitable for use in combination with the **bioluminescence** generating systems herein. The toy weapons may be loaded with a composition containing microspheres of luciferin and/or **luciferase**, or with lyophilized luciferin/luciferin, or other mixtures as described herein. Suitable toy weapons and devices that shoot jets or sprays of water are described in the following sampling of U.S. Pat. No. 5,462,469 [toy gun that shoots **bubbles**]; U.S. Pat. No. 5,448,984 [toy gun that shoots balls and water and can be modified to shoot light or temperature sensitive pellets, which should be stored under appropriate conditions or appropriately packaged, that release luciferin/luciferase when exposed to light]; U.S. Pat. Nos. 5,439,139; 5,427,320; 5,419,458; 5,381,928; 5,377,656; 5,373,975; 5,373,833 and 5,373,832 [which describe toy guns that rely upon a pressurizable bladder for release of air pressure to shoot a projectile, which can be modified to shoot projectiles of encapsulated luciferin/luciferase]; U.S. Pat. No. 5,370,278 [which describes liquid from a port mounted to a headband]; U.S. Pat. Nos. 5,366,108; 5,360,142 [which describes a supply and delivery assembly for use in combination with a pump type water gun or other water propelling device]; U.S. Pat. Nos. 5,346,418; 5,343,850 [which describes a projectile launcher for use in combination with the pellets provided herein]; U.S. Pat. Nos. 5,343,849; 5,339,987 [which describes water guns that have at least one pressurizable air/ water storage tank, a pressurizing mechanism, a channel of release for shooting water and a release mechanism]; U.S. Pat. Nos. 5,326,303; 5,322,191; 5,305,919; 5,303,847 [which describes a device worn on a user's hand with sheaths for the tips of the fingers that includes a housing for a water reservoir, a water pump and electrical motor and a battery pack to be secured to the user's body]; U.S. Pat. Nos. 5,292,032; 5,284,274 [which describes an action toy system including a capsule for containing water, which will herein contain components of a **bioluminescence** generating system, having an orifice and a plunger and a spring loaded mechanism for driving the water from the orifice. The action toy may be configured as a shotgun accepting a plurality of prefilled shell capsules into its breechblock for firing through its barrel, as a missile launcher in which the capsules are mounted to the front of the launcher and the water is ejected directly from the capsule against the target, or as a crossbow with the bow loading the spring-loaded mechanism and a water stream obtained on release of the bow]; U.S. Pat. No. 5,284,272 [which describes a bottle and cap combination for spewing liquid]; U.S. Pat. Nos. 5,256,099; 5,244,153; 5,241,944; 5,238,149; 5,234,129; 5,224,625; 5,213,335; 4,854,480; 5,213,089; 5,184,755; 5,174,477; 5,150,819; 5,141,467; 5,141,462; 5,088,950; 5,071,387 [which describes a figurine-shaped water squirting toy]; U.S. Pat. No. 5,064,095 [which describes a water cannon apparatus]; U.S. Pat. Nos. 5,029,732; 5,004,444; 4,892,228; 4,867,208 [which describes an apparatus for storing and dispensing fluid under pressure]; U.S. Pat. Nos. 4,808,143; 4,784,293; 4,768,681; 4,733,799; 4,615,488 and many others. U.S. Patent No. 5,415,151 describes a toy gun that launches projectiles that can be adapted for shooting the pellets, such as light sensitive pellets that are degraded upon exposure to light, provided herein.

#### Detailed Description Text - DETX:

Such compositions, preferably those that have near neutral pH, can be combined with the components of the bioluminescence generating systems provided herein. In particular, a mixture of luciferase and luciferin, such as the Renilla system or firefly system or Cypridina system, preferably in the form of pellets or microspheres, such as liposomes or other time release capsule, can be added to the bubble mixture. When used, the air added to the mixture will cause a glow, or a glow will be produced as the contents of the pellets are released into the composition. Alternatively, one or more component of the bioluminescence generating system may be added to the bubble making composition, such as, for example, a luciferase and any necessary activators, and the remaining component(s), e.g., a luciferin, may be directly applied to bubbles using a fine spray from an atomizer or other suitable spray or misting means.

#### Detailed Description Text - DETX:

In addition, a fluorescent protein, such as GFP, BFP or a phycobiliprotein, may be added to the bubble-making composition and then illuminated using an external light source. For example, bubbles containing a fluorescent protein may be produced in a room illuminated with light of an appropriate wavelength to cause the fluorescent protein to fluoresce.

#### Detailed Description Text - DETX:

Alternatively, the fluorescent protein may be added to the bubble-making composition containing all the components of the bioluminescence generating system to effect a change of the color of the bubbles. For example, the fluorescent proteins may be added to the bubble-making composition directly or may be added in time-released or slowly-dissolving microspheres or liposomes, such that release of a fluorescent protein in the bubble composition, such as, for example, GFP or a phycobiliprotein, introduces a change in the color of the bubbles. It is particularly advantageous to have the fluorescent protein released into the composition after the container has been opened and used. A single bottle of bubble-making solution will be amenable to the production of more than one color of bubbles. For example, microparticles or liposomes susceptible to breakdown by exposure to air or by agitation by the wand or stick used for blowing bubbles are of particular interest.

#### Detailed Description Text - DETX:

Kits containing such soap compositions, with preferably a moderate pH [between 5 and 8] and bioluminescence generating reagents, including luciferase and luciferin and the fluorescent protein are provided herein. These kits, for example, can be used with a bubble-blowing or producing toy. These kits can also include a reloading or charging cartridge, such as the cartridges provided herein.

Detailed Description Text - DETX:

FIGS. 1 2 and 13 illustrate a preferred embodiment of the bottle/bladder apparatus adapted for use with **bioluminescent bubble** compositions. This **bubble** composition bottle has a bladder 300 positioned within it and held in place, in the neck 302 of the bottle, by friction. A collar 304 is positioned on the neck of the bottle 302, preventing the cap 306 from being screwed completely onto the top of the bottle. The cap 306 contains a plunger 308 which operates to push the bladder 300 into the body of the bottle when the collar 304 is removed and the cap 306 is screwed down tightly. Upon entering the body of the bottle, the bladder is pierced by a piercing pin 310 located on the bottom of the bottle; thereby releasing the contents of the bladder into the bottle. FIG. 13 shows the bottle with the collar 304 removed, the cap 306 screwed on tightly, and the bladder 300 collapsed within it.

Detailed Description Text - DETX:

Component(s) [less than all] of the **bioluminescence** generating reaction are contained in the bladder. The components may be in the form of a solution, suspension, suspended particles, or particles. Prior to use the bottle may be gently agitated. The particles may be time release capsules that release their contents upon exposure to the **bubble** composition or from which the contents diffuse upon mixing of the contents of the bladder with the **bubble** composition. The remaining component(s), such as Ca.sup.2+ or ATP, are contained in the **bubble** composition 314, which is preferably a mild **bubble** forming composition. Selection of the **bioluminescence** generating composition depends upon the selected **bubble** composition and also the desired action. In other embodiments, remaining components, such as ATP, FMN, a flavin reductase or other component that may be somewhat sensitive to the **bubble** composition, of the **bioluminescence** generating system may be added to the **bubble** composition just prior to use.

Detailed Description Text - DETX:

The collar 304 of the bottle is adapted with a **bubble** blowing ring 312, with arm, integral thereto. Thus, the collar 304 is removed, the bladder 300 pierced within the bottle as described and the **bubble** blowing ring 312 dipped into the mixed composition, withdrawn and **bioluminescent bubbles** blown. A standard **bubble** blowing wand [arm with ring] may be used and/or provided in place of that depicted in FIG. 12.

Detailed Description Text - DETX:

The bottle 316 may be fabricated of any material ordinarily used for dispensing **bubbles**. It may be transparent or translucent to the **bioluminescent** light so that any glow in the bottle can be seen.

Claims Text - CLTX:

b) one or more components of a **bioluminescence** generating system and/or a **fluorescent protein**, whereby the combination is a novelty item selected from among personal care items, dentifrices, soaps, body paints and powders, and **bubble** baths.

US-PAT-NO: 5918259

DOCUMENT-IDENTIFIER: US 5918259 A

TITLE: Cellular material detection apparatus and method

DATE-ISSUED: June 29, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Squirrell; David James	Salisbury	N/A	N/A	GB

APPL-NO: 09/ 063368

DATE FILED: April 21, 1998

PARENT-CASE:

This is a division of application Ser. No. 08/793,011, filed Feb. 5, 1997, now U.S. Pat. No. 5,779,710.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
GB	9405392	March 18, 1994
WO	PCT/GB95/00544	March 13, 1995

US-CL-CURRENT: 73/28.01; 356/438 ; 436/164 ; 73/31.07

ABSTRACT:

A method and apparatus for monitoring a gaseous environment for the presence of cellular material capable of providing a measure of presence and/or numbers of cellular microorganisms, such as bacterial cells, in a large volume of air such as in a warehouse or production facility or in an open air location where bacterial presence is suspected. The method and apparatus are particularly suited for determining the likelihood of pathogenic material being present in an environment by batch or on-line measurement of cell numbers. On-line measurement provides continuous monitoring of an environment for presence of pathogens. The device includes a continuous flow luminometer preferably fed by a cyclone or high velocity virtual impactor and luminescence reagents which detect the amount of ATP or adenylate kinase present in a sample of air.

29 Claims, 4 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

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#### Detailed Description Text - DETX:

A continuous flow luminometer apparatus of the invention was constructed using a cyclone unit (1), capable of removing particulates from approximately 1000 liters of air per minute using water as the processing fluids connected to a gas liquid interface device (2) downstream for degassing the fluid and splitting the flow into two parallel processing flows. In this manner the liquid collects the particulates, including any aerosols, and carries them under influence of action of peristaltic pumps (4) via peristaltic tubing conduits (3) of 0.8 mm silicone rubber (Autoclude) to junctions (5) where the influence of pumps (5) draws a flow of detergent (either 0.22 aqueous CTAB solution or 0.4% aqueous Triton X-100) from containers (6) into the processing liquid flow (giving a flow concentration of 0.1% CTAB or 0.2% Triton X-100). Further pumps (7) draw the fluid flows on and deliver them at the same rate as a solution containing a flash kinetic mixture of luciferase, luciferin and buffer (Biotrace pk Bridgend, UK) from containers (8) to a light measurement chamber (not shown) within a luminometer housing (9) where the respective flows and reagents are mixed. The pumps (7) achieve synchronous delivery by acting upon delivery lines (10) and (11) simultaneously and the relative amounts of ATP released by the same particulate sample under influence of the detergents provides amounts of light and thus signals indicative of total cells/spores and eucaryotic cells/spores. The cyclone is shown in more detail in FIG. 2, where (12) is an inlet for gas (atmospheric air) to be separated into particulate enriched and particulate depleted fractions, (13) is a supply of water processing liquid pumped at 1 ml/minute which is entrained with the air flow and passes therewith into the cyclone body main volume (14) where particulate depleted air exits under influence of an air mover (15) while processing fluid and entrapped particulates pass downward to an outlet (16) in the bottom of the cyclone. A peristaltic pump (17) passes the processing fluid to a gas liquid interface of capacity approx. 100 .mu.l where bubbles are removed; the rate of supply of the processing fluid by the pump, or alternatively the removal of fluid by a pump downstream being determined by the liquid level in the interface. Liquid level is determined by a liquid level sensor (not shown) and where the level falls below a set height the pump is operated to draw more processing liquid through until the desired level is restored. Excess liquid and dense particulates from the interface are removed periodically from outlet (18), air leaving the liquid as bubbles is removed via outlet (19) and processing liquid is passed under influence of a peristaltic pump (20) to the downstream tubing for addition of reagents.



US-PAT-NO: 5876995

DOCUMENT-IDENTIFIER: US 5876995 A

TITLE: Bioluminescent novelty items

DATE-ISSUED: March 2, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan, Bruce	Beverly Hills	CA	90210	N/A

APPL-NO: 08/ 757046

DATE FILED: November 25, 1996

PARENT-CASE:

RELATED APPLICATIONS This application is a continuation-in-part of U.S. application Ser. No. 08/597,274 to Bruce Bryan, filed Feb. 6, 1996, entitled "BIOLUMINESCENT NOVELTY ITEMS". The subject matter of U.S. application Ser. No. 08/597,274 is herein incorporated in its entirety by reference thereto.

US-CL-CURRENT: 435/189; 426/104 ; 426/250 ; 426/262 ; 426/268 ; 426/383 ; 426/422 ; 426/540 ; 426/590 ; 426/592 ; 426/656 ; 426/66 ; 530/350

ABSTRACT:

Systems and apparatus for generating bioluminescence, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include toys, paints, slimy play material, textiles, particularly clothing, bubbles in bubble making toys and other toys that produce bubbles, balloons, personal items, such as bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and bubble bath, foods, such as gelatins, icings and frostings, beverages such as beer, wine, champagne, soft drinks, and glowing ice, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable formulation. Cartridges for charging and/or recharging the novelty items with bioluminescence generating systems are also provided.

47 Claims, 34 Drawing figures

Exemplary Claim Number: 25

Number of Drawing Sheets: 9

----- KWIC -----

Abstract Text - ABTX:

Systems and apparatus for generating bioluminescence, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include toys, paints, slimy play material, textiles, particularly clothing, bubbles in bubble making toys and other toys that produce bubbles, balloons, personal items, such as bath powders, body lotions, gels, powders and creams, toothpastes and other dentifrices, soaps, body paints, and bubble bath, foods, such as gelatins, icings and frostings, beverages such as beer, wine, champagne, soft drinks, and glowing ice, fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable formulation. Cartridges for charging and/or recharging the novelty items with bioluminescence generating systems are also provided.

Brief Summary Text - BSTX:

Systems and apparatus for generating bioluminescence, and combinations of these systems and apparatus with inanimate articles of manufacture to produce novelty items are provided. These novelty items, which are articles of manufacture, are designed for entertainment, recreation and amusement, and include, but are not limited to: toys, particularly squirt guns, toy cigarettes, toy "Halloween" eggs, footbags and board/card games; finger paints and other paints, slimy play material; textiles, particularly clothing, such as shirts, hats and sports gear suits, threads and yarns; bubbles in bubble making toys and other toys that produce bubbles; balloons; figurines; personal items, such as bath powders, body lotions, gels, powders and creams, nail polishes, make-up, toothpastes and other dentifrices, soaps, body paints, and bubble bath; items such as inks, paper; foods, such as gelatins, icings and frostings; fish food containing luciferins and transgenic fish, particularly transgenic fish that express a luciferase; plant food containing a luciferin or luciferase, preferably a luciferin for use with transgenic plants that express luciferase; and beverages, such as beer, wine, champagne, soft drinks, and ice cubes and ice in other configurations; fountains, including liquid "fireworks" and other such jets or sprays or aerosols of compositions that are solutions, mixtures, suspensions, powders, pastes, particles or other suitable form.

Brief Summary Text - BSTX:

Thus, the novelty items provided herein include but are not limited to: textiles that glow, ink that glows, paints, particularly fingerpaints, that glow, paper products that glow, toys, particularly reloadable squirt guns that eject a bioluminescent fluid, dolls and dummies with internal organs or parts that glow, figurines and novelty items that glow; toy "cigarettes" that produce glowing "smoke" upon exhalation, toy eggs with glowing yolks and/or whites, toy

footbags that glow and toy board and card games with glowing parts, such as glowing cards, dice, game boards, etc.; foods and beverages that glow, soapy compositions for blowing bubbles that produce bubbles that glow, bubble bath compositions that produce bubbles that glow, fountains that expel glowing fluid, bioluminescent "fireworks", sparklers, magic-wand toys, and numerous other such items. Food containing a luciferin for use with plants and animals that express luciferase, such as transgenic fish, then when fed a food containing an appropriate substrate glow, is also contemplated herein.

#### Detailed Description Text - DETX:

Novelty items are understood by those of skill in manufacture of such items as well as by the purchasing public and are intended herein to include items, such as, toys, including toy guns, dolls, dummies, figurines, balloons, bubbles, "fairy dust", such as micronized lyophilized particles, puzzles, and inks and paints, particularly fingerpaints; theatrical vapors when mixed, for example with dry ice or a fog; souvenirs; textiles, particularly clothing, including T-shirts, hats, swimsuits, bathing suit, wet suits, scuba diving suits, surfing suits, and other water sport or sports attire; foods and beverages, including gelatins, ice cubes and ice in other shapes, beer, wine, champagne, soft drinks, ice creams, sorbets, ices, frostings, and candy; jewelry, medallions, decorative articles, artificial flowers, articles for displaying names, business tradenames, slogans, trademarks on promotional or other such items, such as T-shirts, hats, paints, wrapping paper, gifts intended to promote business goodwill; personal items, such as body paints, body sprays, bubble baths, make-up, body lotions, dentifrices; fountains; jets or sprays of particles or fluids, including "fireworks", sparklers, and magic-wand toys, and many other such novelty items [see, e.g., U.S. Pat. Nos. 5,435,010, 5,460,022, 5,458,931, 5,435,787, 5,435,010, 5,432,623, 5,421,583, 5,419,558, 5,416,927, 5,413,454, 5,413,332, 5,411,427, 5,410,962, 5,407,691, 5,407,391, 5,405,958, 5,405,206, 5,400,698, 5,399,122, 5,398,972, 5,397,609, 5,396,408, 5,393,580, 5,390,086, 5,389,033, 5,383,684, 5,374,805, 5,368,518, 5,363,984, 5,360,010, 5,353,378, 5,351,931, 5,346,455, 5,341,538, 5,323,492, 5,283,911, 5,222,797, 5,177,812, 5,158,349, 4,924,358, 3,597,877 and many others, which describe types of items are considered novelty items]. Any such inanimate item that is combined with bioluminescence is intended to be encompassed herein.

#### Detailed Description Text - DETX:

This system is among the preferred systems for use herein. As will be evident, since the aequorin photoprotein includes noncovalently bound luciferin and molecular oxygen, it is suitable for storage in this form as a lyophilized powder or encapsulated into a selected delivery vehicle. The system can be encapsulated into pellets, such as liposomes or other delivery vehicles, or stored in single chamber dual or other multiple chamber apparatus. When used, the vehicles are contacted with a composition, even tap water, that contains  $\text{Ca}^{2+}$  [or other suitable metal ion], to produce a mixture that glows. This system is preferred for use in numerous embodiments herein, such as in any embodiment that uses pellets. These embodiments include, squirt guns, fairy dust, bubble toys, bubble baths, soaps, linked to textiles, for addition to

beverages and foods.

Detailed Description Text - DETX:

Lyophilized mixtures, and compositions containing the Renilla luciferase are also provided. The luciferase or mixtures of the luciferase and luciferin may also be encapsulated into a suitable delivery vehicle, such as a liposome, glass particle, capillary tube, drug delivery vehicle, gelatin, time release coating or other such vehicle. Kits containing these mixtures, compositions, or vehicles and also a selected article of manufacture, such as a toy gun, bubble composition, balloon, item of clothing, personal item, are also provided. The luciferase may also be linked to a substrate, such as cotton, polyester, polyester-cotton blends, polypropylene, polyvinyltoluene, polyvinyl propylene, glass, ceramic, or plastics are provided in combination with or as part of an article of manufacture.

Detailed Description Text - DETX:

These mutant luciferases as well as the wild type luciferases are among those preferred herein, particularly in instances when a variety of colors are desired or when stability at higher temperatures is desired. It is also noteworthy that firefly luciferases have alkaline pH optima [7.5-9.5], and, thus, are suitable for use in combination with articles of manufacture, such as the bubble compositions that have alkaline pH.

Detailed Description Text - DETX:

Addition of ATP and luciferin to a reaction that is exhausted produces additional light emission. Thus, the system, once established, is relatively easily maintained. Therefore, it is highly suitable for use herein in embodiments in which a sustained glow is desired or reuse of the item is contemplated. Thus, the components of a firefly system can be packaged with the item of manufacture, such as a toy gun, and then combined with the article before use. For example, the luciferin and ATP can be added to a mild bubble or a protein composition that contains luciferase each time the bubbles are used.

Detailed Description Text - DETX:

GFPs and/or BFPs or other such fluorescent proteins may be used in any of the novelty items and combinations provided herein, such as the beverages and toys, including bubble making toys, particularly bubble-making compositions or mixtures. Such systems are particularly of interest because no luciferase is needed to activate the photoprotein and because the proteins are readily digested. These fluorescent proteins may also be used in addition to bioluminescence generating systems to enhance or create an array of different colors.

Detailed Description Text - DETX:

Attachment of phycobiliproteins to solid support matrices is known (e.g., see U.S. Pat. Nos. 4,714,682; 4,767,206; 4,774,189 and 4,867,908). Therefore, phycobiliproteins may be coupled to microcarriers coupled to one or more components of the **bioluminescent** reaction, preferably a **luciferase**, to convert the wavelength of the light generated from the **bioluminescent** reaction. Microcarriers coupled to one or more phycobiliproteins may be used in any of the novelty items and combinations provided herein, such as the multicolor beverages and toys, including **bubble** making toys, particularly **bubble-making** compositions or mixtures.

Detailed Description Text - DETX:

Because the **bioluminescence** generating system components are mixed within the entire bottle, those contents must be used shortly after mixing. Thus, this type of packaging is particularly suitable for use with **bioluminescence** systems that are consumed in a single use or activity such as **bubble-blowing**.

Detailed Description Text - DETX:

The **bioluminescence** generating systems provided herein are contemplated for use with various substances to glow the substance. For example, as discussed below, the **bioluminescence** generating system components may be used to produce glowing aqueous mixtures housed in transparent portions of articles of manufacture, thereby illuminating that portion of the article of manufacture. Additionally, the **bioluminescence** generating system components may be used to produce glowing food or beverage products, textiles, creams, lotions, gels, soaps, **bubbles**, papers, powders or water. Following are brief examples of combinations of **bioluminescence** systems with articles of manufacture and the resulting novelty items contemplated herein.

Detailed Description Text - DETX:

Suitable bath powders and **bubble** baths and other **bubble** compositions for use in these combinations are well known to those of skill in the art [see, e.g., U.S. Pat. Nos.: 5,478,501 4,565,647; 5,478,490; 5,412,118; 5,401,773; and many other examples]. These may be modified by adding the **bioluminescence** generating system components.

Detailed Description Text - DETX:

Examples of uses of the **bioluminescence** generating systems in toys include illumination of dolls, toy vehicles, hoola hoops, yo-yos, balloons, immersible **bubble** generating toys, such as a toy submarine that blows glowing **bubbles**, and any other toy amenable to having a generally translucent covering defining a space for containment of the **bioluminescence** generating system and addition of

the final ingredients necessary for the illumination reaction. Also contemplated herein are toys that eject or spew a fluid. For example, toy or game projectiles are contemplated that contain a luciferase and bioluminescence substrate in an oxygen-free environment. The projectiles rupture upon impact with a hard surface thereby exposing the contents to moisture in the air that contains dissolved oxygen, the bioluminescence activator, and causing reaction.

#### Detailed Description Text - DETX:

Numerous toy guns and other toy weapons that shoot pellets or liquid, in addition to those exemplified herein, are suitable for use in combination with the bioluminescence generating systems herein. The toy weapons may be loaded with a composition containing microspheres of luciferin and/or luciferase, or with lyophilized luciferin/luciferase, or other mixtures as described herein. Suitable toy weapons and devices that shoot jets or sprays of water are described in the following sampling of U.S. Pat. No.: 5,462,469 [toy gun that shoots bubbles]; U.S. Pat. No. 5,448,984 [toy gun that shoots balls and water and can be modified to shoot light or temperature sensitive pellets, which should be stored under appropriate conditions or appropriately packaged, that release luciferin/luciferase when exposed to light]; U.S. Pat. Nos. 5,439,139; 5,427,320; 5,419,458; 5,381,928; 5,377,656; 5,373,975; 5,373,833 and 5,373,832 [which describe toy guns that rely upon a pressurizable bladder for release of air pressure to shoot a projectile, which can be modified to shoot projectiles of encapsulated luciferin/luciferase]; U.S. Pat. No. 5,370,278 [which describes liquid from a port mounted to a headband]; U.S. Pat. Nos. 5,366,108; 5,360,142 [which describes a supply and delivery assembly for use in combination with a pump type water gun or other water propelling device]; U.S. Pat. Nos. 5,346,418; 5,343,850 [which describes a projectile launcher for use in combination with the pellets provided herein]; U.S. Pat. Nos. 5,343,849; 5,339,987 [which describes water guns that have at least one pressurizable air/water storage tank, a pressurizing mechanism, a channel of release for shooting water and a release mechanism]; U.S. Pat. Nos. 5,326,303; 5,322,191; 5,305,919; 5,303,847 [which describes a device worn on a user's hand with sheaths for the tips of the fingers that includes a housing for a water reservoir, a water pump and electrical motor and a battery pack to be secured to the user's body]; U.S. Pat. Nos. 5,292,032; 5,284,274 [which describes an action to system including a capsule for containing water, which will herein contain components of a bioluminescence generating system, having an orifice and a plunger and a spring loaded mechanism for driving the water from the orifice. The action toy may be configured as a shotgun accepting a plurality of prefilled shell capsules into its breechblock for firing through its barrel, as a missile launcher in which the capsules are mounted to the front of the launcher and the water is ejected directly from the capsule against the target, or as a crossbow with the bow loading the spring-loaded mechanism and a water stream obtained on release of the bow]; U.S. Pat. No. 5,284,272 [which describes a bottle and cap combination for spewing liquid]; U.S. Pat. Nos. 5,256,099; 5,244,153; 5,241,944; 5,238,149; 5,234,129; 5,224,625; 5,213,335; 4,854,480; 5,213,089; 5,184,755; 5,174,477; 5,150,819; 5,141,467; 5,141,462; 5,088,950; 5,071,387 [which describes a figurine-shaped water squirting toy]; U.S. Pat. No. 5,064,095 [which describes a water cannon apparatus]; U.S. Pat. Nos. 5,029,732; 5,004,444; 4,892,228; 4,867,208 [which describes an apparatus for storing and dispensing fluid under pressure]; U.S. Pat. Nos.

4,808,143; 4,784,293, 4,768,681; 4,733,799; 4,615,488 and many others. U.S. Pat. No. 5,415,151 describes a toy gun that launches projectiles that can be adapted for shooting the pellets, such as light sensitive pellets that are degraded upon exposure to light, provided herein.

#### Detailed Description Text - DETX:

Such compositions, preferably those that have near neutral pH, can be combined with the components of the bioluminescence generating systems provided herein. In particular, a mixture of luciferase and luciferin, such as the Renilla system or firefly system or Cypridina system, preferably in the form of pellets or microspheres, such as liposomes or other time release capsule, can be added to the bubble mixture. When used, the air added to the mixture will cause a glow, or a glow will be produced as the contents of the pellets are released into the composition. Alternatively, one or more component of the bioluminescence generating system may be added to the bubble making composition, such as, for example, a luciferase and any necessary activators, and the remaining component(s), e.g., a luciferin, may be directly applied to bubbles using a fine spray from an atomizer or other suitable spray or misting means.

#### Detailed Description Text - DETX:

In addition, a fluorescent protein, such as GFP, BFP or a phycobiliprotein, may be added to the bubble-making composition and then illuminated using an external light source. For example, bubbles containing a fluorescent protein may be produced in a room illuminated with light of an appropriate wavelength to cause the fluorescent protein to fluoresce.

#### Detailed Description Text - DETX:

Alternatively, the fluorescent protein may be added to the bubble-making composition containing all the components of the bioluminescence generating system to effect a change of the color of the bubbles. For example, the fluorescent proteins may be added to the bubble-making composition directly or may be added in time-released or slowly-dissolving microspheres or liposomes, such that release of a fluorescent protein in the bubble composition, such as, for example, GFP or a phycobiliprotein, introduces a change in the color of the bubbles. It is particularly advantageous to have the fluorescent protein released into the composition after the container has been opened and used. A single bottle of bubble-making solution will be amenable to the production of more than one color of bubbles. For example, microparticles or liposomes susceptible to breakdown by exposure to air or by agitation by the wand or stick used for blowing bubbles are of particular interest.

#### Detailed Description Text - DETX:

Kits containing such soap compositions, with preferably a moderate pH [between

5 and 8] and **bioluminescence** generating reagents, including **luciferase** and luciferin and the **fluorescent protein** are provided herein. These kits, for example, can be used with a **bubble-bl wing** or producing toy. These kits can also include a reloading or charging cartridge, such as the cartridges provided herein.

#### Detailed Description Text - DETX:

FIGS. 12 and 13 illustrate a preferred embodiment of the bottle/bladder apparatus adapted for use with **bioluminescent bubble** compositions. This **bubble** composition bottle has a bladder 300 positioned within it and held in place, in the neck 302 of the bottle, by friction. A collar 304 is positioned on the neck of the bottle 302, preventing the cap 306 from being screwed completely onto the top of the bottle. The cap 306 contains a plunger 308 which operates to push the bladder 300 into the body of the bottle when the collar 304 is removed and the cap 306 is screwed down tightly. Upon entering the body of the bottle, the bladder is pierced by a piercing pin 310 located on the bottom of the bottle; thereby releasing the contents of the bladder into the bottle. FIG. 13 shows the bottle with the collar 304 removed, the cap 306 screwed on tightly, and the bladder 300 collapsed within it.

#### Detailed Description Text - DETX:

Component(s) [less than all] of the **bioluminescence** generating reaction are contained in the bladder. The components may be in the form of a solution, suspension, suspended particles, or particles. Prior to use the bottle may be gently agitated. The particles may be time release capsules that release their contents upon exposure to the **bubble** composition or from which the contents diffuse upon mixing of the contents of the bladder with the **bubble** composition. The remaining component(s), such as Ca.sup.2+ or ATP, are contained in the **bubble** composition 314, which is preferably a mild **bubble** forming composition. Selection of the **bioluminescence** generating composition depends upon the selected **bubble** composition and also the desired action. In other embodiments, remaining components, such as ATP, FMN, a flavin reductase or other component that may be somewhat sensitive to the **bubble** composition, of the **bioluminescence** generating system may be added to the **bubble** composition just prior to use.

#### Detailed Description Text - DETX:

The collar 304 of the bottle is adapted with a **bubble** blowing ring 312, with arm, integral thereto. Thus, the collar 304 is removed, the bladder 300 pierced within the bottle as described and the **bubble** blowing ring 312 dipped into the mixed composition, withdrawn and **bioluminescent bubbles** blown. A standard **bubble** blowing wand [arm with ring] may be used and/or provided in place of that depicted in FIG. 12.

#### Detailed Description Text - DETX:



The bottle 316 may be fabricated of any material ordinarily used for dispensing **bubbles**. It may be transparent or translucent to the **bioluminescent** light so that any glow in the bottle can be seen.

US-PAT-NO: 5366865

DOCUMENT-IDENTIFIER: US 5366865 A

TITLE: Anti-platelet monoclonal antibody

DATE-ISSUED: November 22, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gralnick; Harvey R.	Kensington	MD	N/A	N/A

APPL-NO: 07/ 334708

DATE FILED: April 6, 1989

US-CL-CURRENT: 435/7.23; 435/343 ; 435/344.1 ; 435/7.1 ; 530/388.22  
; 530/388.25

ABSTRACT:

A method for producing novel monoclonal antibodies against purified platelets are provided. A monoclonal antibodies which inhibits platelet reactions with collagen or collagenous surfaces is described. A new method of detecting and treating tumor metastasis is described.

6 Claims, 33 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

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Detailed Description Text - DETX:

When the PRP has stabilized, add 50 Luciferase. After 1 minute add epinephrine, ADP, ristocetin, thrombin or collagen. Avoid bubbles which will cause the pen to become very erratic. The first wave of aggregation indicates direct contact of reagent on platelets. The second wave indicates release of endogenous ADP which will cause the remaining free platelets to clump. Platelets lose their sensitivity to epinephrine and ADP about 3 hours after drawing. If the patient is abnormal, increase or decrease the amount of reagent in an attempt to produce a normal curve. At the end of the aggregation and release response add 2 ATP(.34 mM) in order to measure the amount of ATP released from the platelet. Calculate the % yield of the control and patient:  
##EQU1##

US-PAT-NO: 3961187

DOCUMENT-IDENTIFIER: US 3961187 A

TITLE: Remote sensing of marine hydrocarbon seeps

DATE-ISSUED: June 1, 1976

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Barringer, Anthony Rene	Willowdale	N/A	N/A	CA

APPL-NO: 05/ 520527

DATE FILED: November 1, 1974

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
UK	51428/73	November 6, 1973

US-CL-CURRENT: 250/301; 250/253 ; 250/461.2

ABSTRACT:

A method of determining the presence of hydrocarbon seeps in the sea from an aircraft or other moving vehicle wherein an intense beam of light from an artificial source such as a laser is directed towards the sea and reflections and/or bioluminescence attributable to said beam occurring in the near surface of the sea are observed in the vehicle. Means is provided for discriminating between responses attributable to reflections from the surface of the sea and reflections and/or bioluminescence occurring below the surface of the sea.

5 Claims, 3 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 1

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Brief Summary Text - BSTX:

Although as stated above a continuous source of light could be used, it is advantageous to employ a pulse source having very short pulse lengths. Thus in the case of a nitrogen laser having a pulse length of at least as short as ten nanoseconds and preferably one nanosecond, the reflection and the scattering from the immediate surface of the ocean as seen at the emitting wavelength, may if desired be gated out in the receiver or otherwise eliminated, and the

intensity of the scattered light from immediately below the surface of the sea can be monitored. Thus it is possible to make remotely, highly sensitive measurements of abnormal turbidity caused by high concentrations of gas bubbles or local accumulations of micro-organisms within the sea itself. In the case of bioluminescence phenomena it is possible to differentiate between bioluminescence at the immediate surface of the sea and sub-surface bioluminescence. This may be useful in separating luminescence associated with polluting oil slicks from underlying micro-organism activity associated with gas seeps.

PGPUB-DOCUMENT-NUMBER: 20020070349

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020070349 A1

TITLE: FLOURESCENCE POLARIZATION ASSAY SYSTEM AND METHOD

PUBLICATION-DATE: June 13, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
HOYT, CLIFFORD C.	NEEDHAM	MA	US	

APPL-NO: 09/ 395661

DATE FILED: September 14, 1999

CONTINUED PROSECUTION APPLICATION: This is a publication of a continued prosecution application (CPA) filed under 37 CFR 1.53(d).

RELATED-US-APPL-DATA:

non-provisional-of-provisional 60109618 19981124 US

US-CL-CURRENT: 250/458.1,250/459.1

ABSTRACT:

An instrument is disclosed for fluorescence assays which is capable of reading many independent samples at the same time. This instrument provides enhanced throughput relative to single-sample instruments, and is well-suited to use in general fluorescence, time-resolved fluorescence, multi-band fluorescence, fluorescence resonance energy transfer (FRET), and fluorescence polarization. This invention is beneficial in applications such as high-throughput drug screening, and automated clinical testing. Also disclosed are means and methods for a fluorescence polarization measurement which is highly sensitive, inherently self-calibrated, and unaffected by lamp flicker or photobleaching. This fluorescence polarization invention can be practiced on a variety of fluorescence instruments, including prior-art equipment such as microscopes and multi-well plate readers.

----- KWIC -----

Summary of Invention Paragraph - BSTX:

[0031] The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of

the disclosure. For a better understanding of the invention, its operating advantages, and specific objects attained by its use, reference should be had to the drawing and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

Detail Description Paragraph - DETX:

[0108] Use of spatial over-sampling, as this is termed, allows for an assessment of measurement quality. In many cases, the sample being measured is essentially homogeneous and the readings of fluorescence should be relatively free of spatial structure except for that imposed by the intensity profile of the excitation beam. The beam profile can be made quite smooth by conventional means such as spatial filtering to the gaussian spatial mode (0,0) as is well known in the optical art. Once this is done, the image of the sample spot should be relatively smooth as well. Presence of dark or light regions within the sample indicate defects in sample preparation such as particulates or bubbles. These can be tested for using image processing techniques such as thresholding against a known profile, and the like. If a sample has an anomalous intensity pattern, it can be identified as suspect and that information may be used to e.g. require a confirming test of that sample element.

PGPUB-DOCUMENT-NUMBER: 20020004942

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020004942 A1

TITLE: Bioluminescent novelty items

PUBLICATION-DATE: January 10, 2002

US-CL-CURRENT: 800/288

APPL-NO: 09/ 803211

DATE FILED: March 8, 2001

RELATED-US-APPL-DATA:

child 09803211 A1 20010308 parent continuation-of 09444762 19991122 US PENDING  
child 09444762 19991122 US parent continuation-of 09135988 19980817 US GRANTED  
parent-patent 6152358 US child 09444762 19991122 US parent continuation-of  
08757046 19961125 US GRANTED parent-patent 5876995 US child 09444762 19991122  
US parent continuation-of 08597274 19960206 US GRANTED parent-patent 6247995 US  
non-provisional-of-provisional 60079624 19980327 US  
non-provisional-of-provisional 60089367 19980615 US

RELATED APPLICATIONS

[0001] This application is a continuation of U.S. application Ser. No. 09/444,762 to Bruce Bryan, filed Nov. 22, 1999, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also continuation of U.S. application Ser. No. 09/135,988 to Bruce Bryan, filed Aug. 17, 1998, now U.S. Pat. No. 6,152,358, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also continuation-in-part of U.S. application Ser. No. 08/757,046 to Bruce Bryan, filed Nov. 25, 1996, now U.S. Pat. No. 5,876,995, entitled "BIOLUMINESCENT NOVELTY ITEMS." This application is also a continuation-in-part of U.S. application Ser. No. 08/597,274, now allowed, to Bruce Bryan, filed Feb. 6, 1996, entitled "BIOLUMINESCENT NOVELTY ITEMS". [0002] U.S. application Ser. No. 09/444,762 is a continuation of U.S. application Ser. No. 09/135,988, which is a continuation-in-part of U.S. application Ser. No. 08/757,046, which is a continuation-in-part of U.S. application Ser. No. 08/597,274. The subject matter of each of U.S. application Ser. Nos. 09/135,988, 08/597,274 and 08/757,046 is herein incorporated in its entirety by reference thereto. This application is also related to provisional application Ser. Nos. 60/079,624 and 60/089,367. The disclosures of each of the above noted patents, applications and provisional applications is incorporated herein by reference thereto.

US-PAT-NO: 6455861

DOCUMENT-IDENTIFIER: US 6455861 B1

TITLE: Fluorescence polarization assay system and method

DATE-ISSUED: September 24, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hoyt; Clifford C.	Needham	MA	N/A	N/A

APPL-NO: 09/ 395661

DATE FILED: September 14, 1999

PARENT-CASE:

RELATED APPLICATIONS This application claims priority from U.S. Provisional Patent Application Ser. No. 60/109,618 which was filed on Nov. 24, 1998.

US-CL-CURRENT: 250/458.1; 356/318

ABSTRACT:

An instrument is disclosed for fluorescence assays which is capable of reading many independent samples at the same time. This instrument provides enhanced throughput relative to single-sample instruments, and is well-suited to use in general fluorescence, time-resolved fluorescence, multi-band fluorescence, fluorescence resonance energy transfer (FRET), and fluorescence polarization. This invention is beneficial in applications such as high-throughput drug screening, and automated clinical testing. Also disclosed are means and methods for a fluorescence polarization measurement which is highly sensitive, inherently self-calibrated, and unaffected by lamp flicker or photobleaching. This fluorescence polarization invention can be practiced on a variety of fluorescence instruments, including prior-art equipment such as microscopes and multi-well plate readers.

60 Claims, 14 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 14

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Brief Summary Text - BSTX:



The various features of **novelty** which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of the disclosure. For a better understanding of the invention, its operating advantages, and specific objects attained by its use, reference should be had to the drawing and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

#### Detailed Description Text - DETX:

Use of spatial over-sampling, as this is termed, allows for an assessment of measurement quality. In many cases, the sample being measured is essentially homogeneous and the readings of **fluorescence** should be relatively free of spatial structure except for that imposed by the intensity profile of the excitation beam. The beam profile can be made quite smooth by conventional means such as spatial filtering to the gaussian spatial mode (0,0) as is well known in the optical art. Once this is done, the image of the sample spot, i.e., the distribution of detector intensity readings, should be relatively smooth as well. Presence of dark or light regions within the sample indicate defects in sample preparation such as particulates or **bubbles**. These can be tested by using image processing techniques such as thresholding against a known profile, and the like. If a sample has an anomalous intensity pattern, i.e., an abnormal distribution, it can be identified as suspect and that information may be used to e.g. require a confirming test of that sample element.

US-PAT-NO: 6436682

DOCUMENT-IDENTIFIER: US 6436682 B1

TITLE: Luciferases, fluorescent proteins, nucleic acids encoding the luciferases and fluorescent proteins and the use thereof in diagnostics, high throughput screening and novelty items

DATE-ISSUED: August 20, 2002

US-CL-CURRENT: 435/189; 124/74 ; 124/76 ; 222/1 ; 42/54 ; 435/183 ; 446/473

APPL-NO: 09/ 609161

DATE FILED: June 30, 2000

PARENT-CASE:

RELATED APPLICATIONS This application is a divisional of U.S. application Ser. No. 09/277,716, filed Mar. 26, 1999 to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "LUCIFERASES, FLUORESCENT PROTEINS, NUCLEIC ACIDS ENCODING THE LUCIFERASES AND FLUORESCENT PROTEINS AND THE USE THEREOF IN

DIAGNOSTICS, HIGH THROUGHPUT SCREENING AND NOVELTY ITEMS." Now U.S. Pat. No.

6,232,107, filed May 15, 2001. This application also claims priority to U.S.

provisional application Ser. No. 60/102,939, filed Oct. 1, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "LUCIFERASES, FLUORESCENT PROTEINS, NUCLEIC ACIDS ENCODING THE LUCIFERASES AND FLUORESCENT

PROTEINS AND THE USE THEREOF IN DIAGNOSTICS, HIGH THROUGHPUT SCREENING AND NOVELTY ITEMS".

Priority is also claimed to U.S. provisional application Serial No.

60/089,367, filed Jun. 15, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "GAUSSIA LUCIFERASE, NUCLEIC ACIDS ENCODING THE LUCIFERASE AND METHODS

USING THE LUCIFERASE", and to U.S. provisional application Serial No.

60/079,624, filed Mar. 27, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "RENILLA GREEN FLUORESCENT PROTEIN COMPOSITIONS AND METHODS."

Benefit

of priority to each of these applications is claimed under 35 U.S.C.

.sctn.119(e). This application is also related to subject matter in U.S.

application Ser. No. 08/757,046, filed Nov. 25, 1996, to Bruce Bryan entitled

"BIOLUMINESCENT NOVELTY ITEMS", now U.S. Pat. No. 5,876,995, issued Mar. 2, 1999, and in U.S. application Ser. No. 08/597,274, filed Feb. 6, 1996, to

Bruce Bryan, entitled "BIOLUMINESCENT NOVELTY ITEMS". This application is also

related to U.S. application Ser. No. 08/908,909, filed Aug. 8, 1997, to

Bruce Bryan entitled "DETECTION AND VISUALIZATION OF NEOPLASTIC TISSUE AND OTHER TISSUES". The application is also related to U.S. application Ser. No.

08/990,103, filed Dec. 12, 1997, to Bruce Bryan entitled "APPARATUS AND

METHODS FOR DETECTING AND IDENTIFYING INFECTIOUS AGENTS". The subject matter

of each of the above noted U.S. applications and provisional applications is herein incorporated by reference in its entirety.

US-PAT-NO: 6232107

DOCUMENT-IDENTIFIER: US 6232107 B1

TITLE: Luciferases, fluorescent proteins, nucleic acids encoding the luciferases and fluorescent proteins and the use thereof in diagnostics, high throughput screening and novelty items

DATE-ISSUED: May 15, 2001

US-CL-CURRENT: 435/189; 435/183 ; 435/252.2 ; 435/320.1 ; 435/6 ; 435/69.1 ; 435/8

APPL-NO: 09/ 277716

DATE FILED: March 26, 1999

PARENT-CASE:

RELATED APPLICATIONS This application claims priority to U.S. provisional application Ser. No. 60/102,939, filed Oct. 1, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "LUCIFERASES, FLUORESCENT PROTEINS, NUCLEIC ACIDS ENCODING THE LUCIFERASES AND FLUORESCENT PROTEINS AND THE USE THEREOF IN DIAGNOSTICS, HIGH THROUGHPUT SCREENING AND NOVELTY ITEMS". Priority is also claimed to U.S. provisional application Ser. No. 60/089,367, filed Jun. 15, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "GAUSSIA LUCIFERASE, NUCLEIC ACIDS ENCODING THE LUCIFERASE AND METHODS USING THE LUCIFERASE", and to U.S. provisional application Ser. No. 60/079,624, filed Mar. 27, 1998, to Bruce Bryan and Christopher Szent-Gyorgyi, entitled "RENILLA GREEN FLUORESCENT PROTEIN COMPOSITIONS AND METHODS." For U.S. purposes, benefit of priority to each of these applications is claimed under 35 U.S.C. .sctn.119(e). This application is also related to subject matter in U.S. application Ser. No. 08/757,046, filed Nov. 25, 1996, to Bruce Bryan entitled "BIOLUMINESCENT NOVELTY ITEMS", now U.S. Pat. No. 5,876,995, issued Mar. 2, 1999, and in U.S. application Ser. No. 08/597,274, filed Feb. 6, 1996, to Bruce Bryan, entitled "BIOLUMINESCENT NOVELTY ITEMS". This application is also related to U.S. application Ser. No. 08/908,909, filed Aug. 8, 1997, to Bruce Bryan entitled "DETECTION AND VISUALIZATION OF NEOPLASTIC TISSUE AND OTHER TISSUES". The application is also related to U.S. application Ser. No. 08/990,103, filed Dec. 12, 1997, to Bruce Bryan entitled "APPARATUS AND METHODS FOR DETECTING AND IDENTIFYING INFECTIOUS AGENTS". The subject matter of each of the above noted U.S. applications and provisional applications is herein incorporated by reference in its entirety.